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College of Pharmacy

1908-1909

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The University catalogues are published by authority of the Board of Regents, as a regular series of bulletins. One bulletin for each college is published every year, and in addition a bulletin of general information outlining the entrance requirements of all colleges of the University, and embodying such items as University equipment, organizations and publications, expenses of students, loan and trust funds, scholarships, prizes, etc. Bulletins will be sent gratuitously, postage paid, to all persons who apply for them. In calling for bulletins, please state the college or school of the University concerning which information is desired. Address,

THE REGISTRAR,

The University of Minnesota,

Minneapolis, Minnesota.



CALENDAR FOR 1908-1909

1908

1909

MAY

S.	M.	T.	W.	T.	F.	S.
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JUNE

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JANUARY

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MARCH

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MAY

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University Calendar

1907-1908

THE UNIVERSITY YEAR

The University year covers a period of thirty-eight weeks beginning on the second Tuesday in September. Commencement day is always the second Thursday in June.

FEBRUARY	4 T	Second semester begins—classes called for regular work
	12 W	Lincoln's birthday—legal holiday
	22 S	Washington's birthday—legal holiday
APRIL	17 F	Good Friday. Recess two days
MAY	2 Th	Regular meeting Board of Regents
	25 M	Senior examinations begin
	30 S	Decoration Day—legal holiday
JUNE	1 M	Semester examinations begin
	6 S	Semester examinations close

COMMENCEMENT WEEK, 1908

SUNDAY	June 7	Baccalaureate service
MONDAY	June 8	Senior class exercises
TUESDAY	June 9	Phi Beta Kappa address. Senior promenade
WEDNESDAY	June 10	Alumni Day. Regular meeting Board of Regents
THURSDAY	June 11	Commencement Day. The thirty-sixth annual commencement
FRIDAY	June 12	Summer vacation begins

1908-1909

SEPTEMBER	7-14	Entrance examinations, condition examinations and registration Classes called for regular work. Seventeenth annual session
OCTOBER	1 Th	Regular meeting Board of Regents
	5 M	Regular meeting University Council
NOVEMBER	26 Th	Thanksgiving Day. Recess three days
DECEMBER	7 M	Regular meeting University Council
	8 T	Annual meeting Board of Regents
	19 S	Holiday recess begins (no classes)
JANUARY	5 T	Work resumed in all departments
	23 S	Semester examinations begin
	30 S	Semester examinations close
FEBRUARY	2 T	Second semester begins—classes called for regular work
	12 F	Lincoln's birthday—legal holiday
	22 M	Washington's birthday—legal holiday
APRIL	5 M	Regular meeting University Council
	9 F	Good Friday—Recess two days

MAY	6 Th	Regular meeting Board of Regents
	24 M	Senior examinations begin
	31 M	Decoration Day—legal holiday
JUNE	1 T	Semester examinations begin
	5 S	Semester examinations close
	7 M	Regular meeting University Council

COMMENCEMENT WEEK, 1909

SUNDAY	June 6	Baccalaureate service
MONDAY	June 7	Senior class exercises
TUESDAY	June 8	Sigma Xi address. Senior promenade
WEDNESDAY	June 9	Alumni Day. Regular meeting Board of Regents
THURSDAY	June 10	Commencement Day. The thirty-seventh annual commencement
FRIDAY	June 11	Summer vacation begins

The University

THE UNIVERSITY OF MINNESOTA comprises the following named schools, colleges and departments:

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE DEPARTMENT OF AGRICULTURE, including—

The College of Agriculture

The School of Agriculture

Short Course for Farmers

The Dairy School

The Crookston School of Agriculture

THE COLLEGE OF LAW

THE COLLEGE OF MEDICINE AND SURGERY

THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY

THE COLLEGE OF DENTISTRY

THE COLLEGE OF PHARMACY

THE SCHOOL OF MINES

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF EDUCATION

THE GRADUATE SCHOOL

The Regents of the University have entrusted to their charge:

THE EXPERIMENT STATIONS, including—

The Main Station at St. Anthony Park

The Sub-Station at Crookston

The Sub-Station at Grand Rapids

THE GEOLOGICAL AND NATURAL HISTORY SURVEY

Bulletins of these schools, colleges and departments may be obtained upon application to the University Registrar.

The Board of Regents

CYRUS NORTHROP, LL.D., MINNEAPOLIS *Ex-Officio*
The President of the University

The HON. JOHN LIND, MINNEAPOLIS 1914
The President of the Board

The HON. JOHN A. JOHNSON, ST. PETER *Ex-Officio*
The Governor of the State

The HON. JOHN W. OLSEN, ALBERT LEA *Ex-Officio*
The State Superintendent of Public Instruction

The HON. THOMAS WILSON, ST. PAUL 1909

The HON. A. E. RICE, WILLMAR 1909

The HON. B. F. NELSON, MINNEAPOLIS 1910

The HON. DANIEL R. NOYES, ST. PAUL 1910

The HON. PIERCE BUTLER, ST. PAUL 1910

The HON. S. M. OWEN, MINNEAPOLIS 1913

The HON. W. J. MAYO, ROCHESTER 1913

The HON. HENRY B. HOVLAND, DULUTH 1914

C. D. DECKER, MINNEAPOLIS,
Secretary of the Board

Executive Officers

THE UNIVERSITY

CYRUS NORTHROP, LL. D., *President*

ERNEST B. PIERCE, B. A., *Registrar*

JAMES T. GEROULD, B. A., *Librarian*

C. D. DECKER, *Purchasing Agent*

J. D. BREN, *Cashier*

THE COLLEGES

JOHN F. DOWNEY, M. A., C. E., *Dean of the College of Science, Literature,
and the Arts*

FREDERICK S. JONES, M. A., *Dean of the College of Engineering and the
Mechanic Arts*

EUGENE W. RANDALL, *Dean and Director of the Department of Agriculture*

WILLIAM S. PATTEE, LL. D., *Dean of the College of Law*

FRANK FAIRCHILD WESBROOK, M. A., M. D., C. M., *Dean of the College of
Medicine and Surgery*

EUGENE L. MANN, B. A., M. D., *Dean of the College of Homeopathic
Medicine and Surgery*

ALFRED OWRE, D. M. D., M. D., *Dean of the College of Dentistry*

FREDERICK J. WULLING, Phm.D., LL.M., *Dean of the College of Pharmacy*

WILLIAM R. APPLEBY, M. A., *Dean of the School of Mines*

GEORGE B. FRANKFORTER, Ph. D., *Dean of the School of Chemistry*

GEORGE F. JAMES, Ph. D., *Dean of the School of Education*

HENRY T. EDDY, C.E., Ph. D., LL. D., *Dean of the Graduate School*

ADA L. COMSTOCK, M. A., *Dean of Women*

The University Council

At the regular meeting of the Board of Regents of the University, May 31st, 1905, a University Council was established according to the following plan:

I. The name of the body shall be The University Council. It shall consist of the President of the University, the Deans of the various colleges and schools, one elected representative from each college or school for each 400 students or major fraction thereof, and one representative of the general alumni association.

II. The elected members shall serve for a period of one year. They shall be chosen from the various faculties at the time of the selection of standing committees. The representative of the general alumni association shall be chosen by that body at its annual meeting from among the alumni who are not members of the University.

III. The Council shall be authorized to—

a) Appoint the following committees or the faculty representation thereon:

The University auditing committee

The University press committee

The committee on athletics

The committee on University relations to other institutions of higher learning

The committee on health and sanitation

The committee on commencement and other University functions

The committee on catalogue, programs and courses of study

The committee on student entertainments and social affairs

And such other committees as the general University interests may require

b) Receive reports from such committees and to make such recommendations as may be required.

c) Consider and act upon any matter of general University interest beyond the province of a single faculty which may be referred to it by the President of the University or any faculty.

IV. The Council shall hold stated meetings upon the first Monday of October, December, April and June, and such other meetings as the President of the University may call.

Representatives to the Council

The University

PRESIDENT CYRUS NORTHROP

The College of Science, Literature and the Arts

DEAN JOHN F. DOWNEY

PROFESSOR JOHN H. GRAY

PROFESSOR J. C. HUTCHINSON

PROFESSOR H. F. NACHTRIEB

PROFESSOR NORMAN WILDE

The College of Engineering and the Mechanic Arts

DEAN FREDERICK S. JONES

PROFESSOR GEORGE D. SHEPARDSON

The College and School of Agriculture

DEAN EUGENE W. RANDALL

PROFESSOR HARRY SNYDER

PROFESSOR SAMUEL B. GREEN

The College of Law

DEAN WILLIAM S. PATTEE

PROFESSOR HENRY J. FLETCHER

The College of Medicine and Surgery

DEAN F. F. WESBROOK

PROFESSOR THOMAS G. LEE

The College of Homeopathic Medicine and Surgery

DEAN EUGENE L. MANN

The College of Dentistry

DEAN ALFRED OWRE

The College of Pharmacy

DEAN FREDERICK JOHN WULLING

The School of Mines

DEAN WILLIAM R. APPELBY

The School of Chemistry

DEAN GEORGE B. FRANKFORTER

The College of Education

DEAN GEORGE F. JAMES

The Graduate School

DEAN HENRY T. EDDY

General Alumni Association

DAVID P. JONES

University Council Committees

The University Auditing Committee

PROFESSORS ANDERSON, FLETCHER, OWRE, SIGERFOOS, SPRINGER

The Committee on Athletics

PROFESSORS PAIGE, BROOKE, HARDING, D. P. JONES, LITZENBERG

The Committee on Grounds and Sanitation

PROFESSORS FLATHER, BASS, BRACKEN, HICKMAN, RANDALL, SIDENER,
WESBROOK

The Committee on Catalogue, Programs and Course of Study

DEANS APPLEBY, EDDY, FRANKFORTER, JAMES, JONES, MANN, OWRE,
WULLING; PROFESSORS FLETCHER, JOHNSTON, SCHLENKER, SNYDER,
E. B. PIERCE

The Press Committee

PROFESSORS SCHAPER, BAUER, CONSTANT, ERDMANN, JAMES

The Committee on Commencement and other University Functions

PROFESSORS NACHTRIEB, JENKS, OWRE, PATTEE, RANDALL, SCHLENKER,
WASHBURN

The Committee on Student Entertainments and Social Affairs

PROFESSORS FRANKFORTER, BASS, COMSTOCK, COOKE, MULLEN, PIKE

The Committee on University Relations to other Institutions of Higher Learning

PROFESSORS DOWNEY, BOTHNE, EDDY, GRAY, GREEN, JAMES, LEE

The Committee on University Extension and University Lectures

PROFESSORS WEST, HAECKER, RANKIN, SCHLENKER, SHEPARDSON

The Committee on the Library

PROFESSORS EDDY, FLETCHER, F. S. JONES, LEE, REYNOLDS,
VAN BARNEVELD, WEST

The College of Pharmacy

FACULTY

CYRUS NORTHROP, LL.D., *President.*

FREDERICK J. WULLING, Phm.D., LL.M., etc., *Dean: Professor of Pharmacology*

RICHARD O. BEARD, M.D., *Professor of Physiology*

E. D. BROWN, Pharm.D., M.D., *Acting Professor of Materia Medica and Therapeutics*

FREDERIC E. CLEMENTS, Ph.D., *Professor of Botany*

IRA HARRIS DERBY, B.S., *Assistant Professor of Chemistry*

GEORGE B. FRANKFORTER, M.A., Ph.D., *Professor of Chemistry*

EVERHART P. HARDING, M.S., Ph.D., *Assistant Professor of Chemistry*

CHAS. F. SIDENER, B.S., *Professor of Quantitative Chemistry*

FRANK F. WESBROOK, M.A., M.D., C.M., *Professor of Bacteriology*

M. R. WILCOX, M.D., *Assistant Professor of Physiology*

.....*Professor of Pharmacognosy*

INSTRUCTORS AND ASSSTANTS

GUSTAV BACHMAN, Ph.C., Ph.M., *Instructor in Pharmacy*

OSCAR BLOSMO, Ph.C., *Assistant in Pharmacy*

FREDERICK K. BUTTERS, M.S., *Instructor in Pharmaceutical Botany and Microscopy and Pharmacognosy*

FRANK F. GROUT, B.S., *Instructor in Mineralogy*

JOHN A. HANDY, Ph.C., *Instructor in Chemistry*

GEORGE D. HEAD, B.S., M.D., *Instructor in Clinical Microscopy*

JOHN ELDON HYNES, Ph.C., *Assistant in Clinical Microscopy*

E. P. JONES, Ph.B., *Pharmacy Laboratory Assistant*

C. N. MCCLOUD, Phm.D., M.D., *Lecturer on First Aids to the Injured*

J. P. SEDGWICK, B.S., M.D., *Instructor in Physiological Chemistry*

W. D. SHELDON, M.D., *Instructor in Therapeutics*

.....*Instructor in Pharmaceutical Latin*

.....*Assistant in Materia Medica*

.....*Assistant in Pharmacognosy*

THE REGULAR COURSE

The complete regular course extends over two years of nine months each. Students may arrange their work so as to complete the course in three years, without additional expense to them for tuition.

ENTRANCE REQUIREMENTS

A.—To the Two-Year Course

While nearly all students enrolled in this college are graduates of full four-year high school courses, such a training prior to entrance is not obligatory at the present time. The requirements, however, are being raised gradually in such a way that soon they shall be a full high school preparation or an equivalent.

Applicants may be admitted without examination if they bring certificates of graduation from, or standing in, institutions of the collegiate grade or present other credentials showing that they have successfully completed the branches of study embraced in a full four-year high school course, or an equivalent, provided that among the branches completed are:

English, two years, including the principles of composition and practice in written expression.

Algebra, one year, elementary, up to beginning of higher algebra.

Geometry, one year, elementary.

Physics, one year, elementary.

Latin, two years: grammar, one year; Caesar (four books), one year.

- II. Other applicants must pass examinations in the branches above specified, i. e., in English, algebra, geometry, physics and Latin, or present satisfactory evidence of having completed these branches, for which substitutes cannot be accepted.

Students will be allowed to carry not more than two conditions which, however, must be removed before the final examinations in the first year subjects.

In certain cases credit is given for drug store experience.

B.—To the Three-Year Course

The minimum requirements for admission to the three-year course are the same as those for admission to the two-year course II., with the exception that students may carry as conditions not more than three of the entrance subjects among which English cannot be. Students must pursue the branches in which they are conditioned during their first year and pass examinations in them or present evidence of having satisfactorily completed the branches. The subjects are not taught at the college, but may be taken at the Academy near by, or at the city high schools or with

private tutors. The University Y. M. C. A. usually establishes courses for the benefit of students conditioned in entrance branches.

Applicants whose preparatory course of study has not conformed precisely to the requirements above enumerated will be allowed to offer, in lieu of a portion of these requirements, equivalent preparation in similar branches of study; and if they show, by examination, or by other evidence, that their preparation has been substantially equivalent, such branches will be accepted as substitutes for those omitted.

The examinations for entrance are conducted by the faculty of the college of pharmacy, in the pharmacognosy rooms, beginning at 9:00 a. m., on Tuesday, September 15, 1908. Lecture work begins as soon as possible after the examinations, usually the following day.

Every applicant is required to furnish a certificate of good moral character.

Those who do not pass the entrance examinations, may enter and complete their course in three years, provided they pursue the subjects required for admission, in addition to the professional work that may be assigned to them, and pass their entrance examinations, before the end of the first year. There are a number of preparatory schools in the neighborhood of the University, where the subjects required for admission may be pursued.

GRADUATE COURSES

In addition to the regular course this college offers two graduate courses, the first continuing through one college year and leading to the degree "master of pharmacy," and the second continuing through an additional year or longer, and leading to the degree "doctor of pharmacy." The first graduate course, the one leading to the master's degree, is now in operation. The curriculum includes higher pharmaceutical chemistry, pharmaceutical assaying, higher organic chemistry, proximate and ultimate analysis, chemistry of food, spectroscopic work, therapeutics, and bacteriology, and a thesis of at least 3,000 words, embodying the results of original work, but this curriculum may be changed by the faculty if occasion or experience require.

The requirements for admission are a diploma from a Minnesota high school of the first grade, or an equivalent; a diploma from a college of pharmacy whose curriculum, extent and kind of work and length of under-graduate course are equal to those of the under-graduate work of this college; an acquaintance with either German or French sufficient to enable the student to read and understand the scientific literature of those languages, and a certificate of registration as pharmacist from any state board of pharmacy. The fees for this course are seventy-five dollars,

and, upon graduation, an additional fee of ten dollars for diploma. The rules relating to damage, waste and breakage in laboratories are the same as those applying to the undergraduate course.

The course leading to the doctor's degree will begin as soon as there are sufficient applicants.

PROPOSED NEW COURSES

Beginning with the school year 1909, two additional courses will be instituted: the one, a lower and shorter than the regular course to conform to the minimum requirements of the American Conference of Pharmaceutical Faculties; the other, a higher than the regular course to lead to the degree, Bachelor of Science in Pharmacy, and to include four years of work. The details have not yet been worked out but it is probable that the former will include about two-thirds of the work of the regular course and will cover two years of at least six months each. Possibly opportunity will be offered to complete the work in twelve consecutive months. The entrance requirements will include the first year in high school or equivalent training or whatever the entrance requirements of the Conference may be at the time.

The higher course will cover four years of nine months each and will include two years of academic and cultural work. The qualifications for entrance to this course will be the same as those required for entrance to the College of Literature, Science and Arts. Those presenting evidence of having completed the first two years of a collegiate course may complete the course in two years, providing the collegiate work completed includes certain subjects in the sciences and mathematics. Full announcement regarding these courses will be made in next year's bulletin.

REGISTRATION

All applicants for admission to the regular courses must present to the Dean not later than September 15, their school or high school certificates, diplomas or such other credentials as they may wish to offer toward meeting in whole or in part the entrance requirements. If these are found satisfactory the applicant will register in the office of the University registrar, who will issue a card to the University accountant to whom the applicant will pay the tuition and breakage fees and microscope rental and receive receipts therefor. Registration is completed by depositing these receipts in the office of the Dean. The student is then classified.

PROFESSIONAL EXAMINATIONS AND STANDINGS

Examinations are held at the end of the regular school year and during the last week of the first semester, and are supplementary to the written

recitations and quizzes that are held at frequent intervals during the year, and with them form the basis of final determination of fitness for promotion or graduation. Students are rated throughout the year, and all who have a standing of ninety per cent, or more, in certain of the branches, may not be required to take the final examination in those branches.

Students are not required to write graduating theses, but instead, they keep complete records of all their laboratory work. The records are to be kept in substantially bound books, to be approved by the faculty. The respective professors call for the records for inspection and rating once a month or oftener. Duplicates of records are to be furnished the college by the students. The college provides the paper.

The standing of students is determined by the results of recitations, written examinations, laboratory work and attendance. It is indicated by the terms "excellent," "passed," "conditioned," "incomplete," or "failed." Conditions may be removed as indicated below. Incomplete work must be made up before the final examinations of the following year.

ATTENDANCE

In order to become eligible for final examinations, students are required to attend at least four-fifths of the lectures in each course. This rule is not intended for the benefit of those who seek admission after the opening of the college year, but is designed to cover cases of sickness or unavoidable absence. It does not apply to laboratory courses which must be taken in full and must be entered during the first week in which they begin.

CONDITIONS

Students having conditions in more than two major or in more than three minor subjects of the first year, cannot enter upon the second year's work. All entrance conditions must be removed before the next spring examination. Candidates for graduation must have removed all conditions before entering upon the second semester of the graduating year.

Condition examinations are held during the first week of the course in September. The dates are usually posted in June. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given.

All who carry a condition and fail to remove it within one year will be charged an extra examination fee.

Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must present themselves at the above date and pass the examinations of all departments in which they wish to be exempt, if such examinations are deemed necessary by the professors in charge of the various departments. Students will not be permitted to substitute private work in any branch for the regular course work.

REQUIREMENTS FOR GRADUATION

Regular attendance at lectures, recitations and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven-eighths of the required number of exercises.

Every person upon whom the degree is conferred must be of good moral character, and must be at least twenty-one years old; must have attended two full lecture and laboratory courses, the last at this college, and must have passed a successful examination in the subjects required for graduation.

Drug store experience is not a requirement for graduation.

Those who fail to appear for examination after having paid their diploma fee, or those who do not pass satisfactorily, will be permitted to present themselves at any subsequent examination, upon payment of an additional fee of five dollars, and complying with all other requirements.

DEGREE

This college confers the degree of Bachelor of Pharmacy, (Ph.B.), upon the graduates of the regular course.

FEES

TWO YEAR COURSE

First year	\$75.00
Second year	90.00
	————\$165.00

THREE YEAR COURSE

First year	\$45.00
Second year	55.00
Third year	65.00
	————\$165.00

There are no other fees in the regular course. Fees are payable at the time of registration. Those desiring to take special work will be required to pay fifteen dollars a subject in the didactic courses and twenty-five dollars in the laboratory courses.

Students will be charged for laboratory material if used unreasonably. At the end of the laboratory courses students will be required to pay for breakage and damage to utensils in their care. If a student is careful this charge need not amount to more than two or three dollars. Students are to provide themselves with a designated set of metric weights, a set of apothecary's weights and steel spatulas. The expense of these is within three dollars. Students using platinum crucibles are charged for same. Upon the return of the crucible in the original condition the charge is cancelled; if the crucible is in any wise damaged the full value is collected from the student. A rental of two dollars per college year or fraction is collected for use of a microscope. All money is payable to the accountant of the University, who will give receipts which must be deposited in the Dean's office.

Fees will not be returned, except in case of discontinuance for sufficient reason before the student has been assigned to a place in the laboratory.

BREAKAGE AND LOSS

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give receipt. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

All apparatus lost or damaged will be charged to him, and must be paid for before he can receive credits for his course, or take his annual examinations.

CAUTION FEE

A deposit of ten dollars will be made with the accountant each year, by every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage to or in the college buildings and of breakage and loss of laboratory apparatus and material. It will be returned to the student at the close of each year, minus the cost of articles assigned to him, that are not returned in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

GENERAL STATEMENT

Students are permitted to use their own crude drugs for the making of preparations, provided such material is approved by the Dean of the

college as suitable to demonstrate the lesson in hand. Finished products from such material, if of satisfactory quality, are at the disposal of the student, unless made with the tax-free alcohol belonging to the college.

Absence will not be excused, unless satisfactory reasons are given to the professor in charge. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension. Students are earnestly requested to be present at the beginning of the school year, but those who cannot enter in the fall may enter at the beginning of the second semester taking any of the subjects beginning then. Special students, however, may enter at any time; they will not be rated on their work, nor will they be examined unless they make special request therefor. Any of the facilities for work in the University are open to the students of this college, subject to the approval of the Dean. Opportunity is afforded to do advanced work in all branches. Text-books may be obtained after coming to the University.

Rooms and board convenient to the college can be obtained at prices ranging from \$3.00 to \$5.00 per week, according to accommodations and furnished rooms without board, from \$5.00 to \$10.00, and unfurnished rooms from \$4.00 to \$7.00 per month.

A list of rooms and boarding places is kept by the secretary of the University Y. M. C. A., to whom inquiries or applications may be addressed.

POSITIONS FOR GRADUATES

The demand for graduates of this College has always been greater than the supply and is continually growing. The rule is that practically all of the senior class are engaged before graduation. This College is recognized in every state, including those in which standards of efficiency have been established, and its graduates are everywhere admitted to Board examinations.

STATE BOARD OF PHARMACY

The Board meets at the college four times each year. For information concerning the Board address the Secretary, Mr. Chas. J. Moos, 502 Bank of Commerce Building, Minneapolis, Minn.

COLLEGE OF PHARMACY ALUMNI ASSOCIATION

The Alumni Association meets annually in the college building the day before commencement, at 3 p. m. Every member of the Association is urgently requested to report change of address to the secretary.

COMMUNICATIONS

Address communications to the Dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minn.

THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

The College of Pharmacy of the University of Minnesota is one of the twenty-nine colleges constituting the membership of the American Conference of Pharmaceutical Faculties.

COLLEGE TRAINING FOR PHARMACISTS

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In New York, Pennsylvania, Hawaii, Wisconsin and Ohio such training is obligatory either by law or by rule of the Boards of Pharmacy. In a number of other states credit is given for college work. In Minnesota graduates from recognized colleges need to have only two years of practical experience, while all others must have four years of drug store experience before they become eligible for examination by the State Board of Pharmacy for full license to practice in Minnesota. At the Joint Conference of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties, held at Indianapolis, Ind., in September, 1906, the following resolution was adopted:

"Special education for the practice of pharmacy is in this age a necessity and should as rapidly as possible be made compulsory. The rules of the Boards of Pharmacy are such as to promote and encourage it in all practicable ways. The special pharmaceutical education should include substantial laboratory courses."

The training advocated by these two most representative bodies and by the American Pharmaceutical Association can be obtained only at colleges or schools of pharmacy of recognized standing. It is admitted that the State of Minnesota through its University College of Pharmacy is affording instruction of the most approved kind.

In the organization of this college the Board of Regents and the faculty have had the co-operation of the pharmacists of the state. The character of instruction is of high order and every effort is made to comply with the demands of the profession in the Northwest, or elsewhere, in the maintenance of a course of instruction of the highest grade. The college is located on the university campus, in the Medical Science Laboratory building, and is one of the colleges comprising the department of medicine, but is distinct in the government of its affairs. The

building and laboratories are on a par with the best, and their equipment is complete.

The work of the college, as outlined in the following pages, is conducted by means of lectures, recitations and laboratory exercises. Students find their time fully occupied. Those who feel unable to complete the work in two years may divide it in a manner to complete it in three years. Practising pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities.

Courses of Instruction

COURSES OF INSTRUCTION COMPRISING THE REGULAR PHARMACY COURSE

The complete regular course extends over two years of nine full months each. Students may arrange their work so as to take the course in three years. It is quite possible that three years attendance will be required of students in this college in the near future. The sixteenth annual course begins on September 15, 1908, on which day all students in pharmacy should register. The office of the Registrar is open for the purpose of registration as early as September 8th, but students must first report at the Dean's office in the pharmacy building.

FIRST YEAR

FIRST QUARTER

Botany 1, eleven hours, Mr. Butters and Assistant

Pharmacy 9, five hours, Professor Wulling

Chemistry 1, fifteen hours, Professor Derby and Mr. Handy

SECOND QUARTER

Botany 1, six hours, Mr. Butters and Assistant

Pharmacy 10, three hours, Professor Wulling

Pharmacy 1, 2 and 3, twelve hours, Professor Wulling, Mr. Bachman,
Mr. Blossmo and Assistant

Chemistry 2, fifteen hours, Professor Derby and Mr. Handy

THIRD QUARTER

Pharmacy 11, two hours, Professor Wulling

Pharmacy 4, four hours, Professor Wulling, Mr. Bachman, Mr. Blossmo
and Assistant

Pharmacy 7, one hour, Mr. Bachman

Materia Medica 1, five hours, Professor Brown and Assistant

Chemistry 5, fifteen hours, Professor Frankforter, Assistant Professor
Derby and Mr. Handy

Physiology 1, nine hours, Professors Beard and Wilcox

FOURTH QUARTER

Pharmacy 11, two hours, Professor Wulling
Materia Medica 2, five hours, Professor Brown and Assistant
Pharmacy 5 and 6, six hours, Professor Wulling, Mr. Bachman, Mr. Blosmo and Assistant
Pharmacy 7, two hours, Mr. Bachman
Pharmacy 8, one hour, Mr. Bachman
Botany 2 and 3, nine hours, Mr. Butters and Assistant
Chemistry 5, fifteen hours, Professor Frankforter, Assistant Professor Derby and Mr. Handy

SECOND YEAR

FIRST QUARTER

Pharmacy 12, one hour, Professor Wulling
Pharmacy 13, two hours, Professor Wulling
Pharmacy 14, sixteen hours, Professor Wulling, Mr. Bachman, Mr. Blosmo and Assistant
Mineralogy and Crystallography 1, one hour, Mr. Grout
Pharmacognosy 1, five hours, Mr. Butters and Assistant
Pharmacy 16 and 17, sixteen hours, Professor Wulling, Mr. Bachman and Assistants
Pharmacy 23, one hour, Mr. Bachman

SECOND QUARTER

Pharmacy 13, two hours, Professor Wulling
Mineralogy 2, one hour, Mr. Grout
Pharmacognosy 1, nine hours, Mr. Butters and Assistant
Pharmacy 18, sixteen hours, Professor Wulling, Mr. Bachman, Mr. Blosmo and Assistant
Chemistry 4, nine hours, Professor Frankforter, Assistant Professors Derby and Harding
Pharmacy 23, one hour, Mr. Bachman

THIRD QUARTER

Pharmacognosy 1, six hours, Mr. Butters and Assistant
Chemistry 3, sixteen hours, Professor Sidener and Assistant
Pharmacy 23, one hour, Mr. Bachman
Pharmacy 13, two hours, Professor Wulling
Pharmacy 19 and 15, twenty hours, Professor Wulling, Mr. Bachman, Mr. Blosmo and Assistant

FOURTH QUARTER

Pharmacy 13, one hour, Professor Wulling

Pharmacy 23, two hours, Mr. Bachman

Pharmacognosy 2, six hours, Mr. Butters

Pharmacy 20, 21, 22, 24, twenty hours, Professor Wulling, Mr. Bachman, Mr. Blosmo and Assistant

Therapeutics 3, six hours, Professor Brown and Assistant

Pharmacy Law, one and one-half hour, Professor Wulling

First Aids, one and one-half hours, Dr. McCloud

THIRD YEAR

Students taking three years to do the work of the regular two-year course will divide the work in an equitable way subject to the approval of the Dean. Students are urged to devote three years to the completion of the course.

PHARMACY

FREDERICK J. WULLING, Phm.D., LL.M., etc., *Professor of Pharmacology*

GUSTAV BACHMAN, Ph.C., Ph.M., *Instructor in Pharmacy*

OSCAR BLOSMO, Ph.C., *Assistant in Pharmacy*

E. P. JONES, Ph.B., *Laboratory Assistant*

1. HISTORY OF PHARMACY PROFESSOR WULLING

One-third credit (six hours lecture) First quarter, first year

The history of the U. S. Pharmacopœia through all its revisions.
Dispensatories, text-books, and works of reference.

2. METROLOGY PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT

Two-thirds credit (twelve hours lecture) First quarter, first year

Weights and measures, including metric system; balances—construction, varieties, methods of weighing; specific gravity in detail; specific volume, alligation, etc.

3. THE PHYSICS OF PHARMACY PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT

Two and one-half credits (eighteen hours lecture, fifty-four hours laboratory) Second quarter, first year

Prerequisite, pharmacy 2.

Students are required to have had elementary physics before entering. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. Special attention is paid to heat. Specific heat; thermometers—the various scales, testing and comparing thermometers; combustion of solids, liquids and gases in various kinds of furnaces, stoves and burners; application of heat in drying ovens, steam, hot-air and water ovens; drying closets, desiccators, blow-pipes, crucibles; baths for controlling and equalizing heat; water-salt-oil-glycerine-paraffin-hot-air-baths; evaporation—spontaneous, rapid, slow, in vacuo; ebullition—boiling points, fusion; sublimation, calcination, dehydration, torrefaction, roasting, reduction, oxidation; carbonization, de-

flagration, ignition, etc.; solution—pharmaceutical, simple, chemical, saturated; circulatory displacement; dialysis—construction of dialyser, osmosis, endosmosis, exosmosis; crystalloids and colloids, etc.

4. PHARMACEUTICAL PROCESSES

PROFESSOR WULLING, MR. BACHMAN
AND ASSISTANT

Three and one-half credits (twenty-four hours lecture, seventy-two hours laboratory) Second and third quarters, first year

Prerequisite, pharmacy 3.

The processes not taken up in 3, constitute the subjects of this course. In part they are: drug grinding and powdering; comminution; contusion; trituration; sifting; elutriation; levigation; lixiviation; filtration—filtering medii, filtration of solutions, oils, syrups, rapid filtration, filtration in vacuo, hot filtration, colation; washing—displacement, continuous; decantation—the syphon and its uses; precipitation—methods, vessels, separating, drying, weighing; granulation—granular effervescent salts; desiccation; exsiccation; crystallization—water of crystallization, deliquescence, efflorescence, methods of obtaining crystals, collecting, draining, washing, drying crystals, fractional crystallization; distillation—stills, simple, fractional, destructive; extraction; maceration; expression; percolation—history, theories, percolators, exhaustion, repercolation, continuous percolation, fractional percolation; clarification; decolorization

5. PHARMACOPOEIAL PREPARATIONS

PROFESSOR WULLING, MR. BACHMAN
AND ASSISTANT

Five credits (thirty hours lecture, one hundred twenty hours laboratory) third and fourth quarters, first year.

This course includes the study and preparation of official bodies for which the U. S. P. gives formulae and processes, and includes waters, solutions, syrups, mucilages, spirits, infusions, decoctions, tinctures, fluid extracts, vinegars, wines, liniments, oleates, ointments, cerates, resins, oleo-resins, honeys; glycerites, mixtures, emulsions, elixirs, collodions, pills, capsules, powders, suppositories, bougies, plasters, papers, cachets, etc.

6. MATHEMATICS OF PHARMACY

PROFESSOR WULLING AND MR. BACHMAN

While students are required to have a preparation in arithmetic and algebra before entering, they receive frequent drills at stated hours and as occasion requires or suggests throughout the entire course. Students are required to take a final examination in the subject at the end of the first year, at which examination they must attain a rating of at least eighty per cent.

7. PHARMACY QUIZ

MR. BACHMAN

Three credits (fifty-four hours) Second, third and fourth quarters, first year

Prerequisites, pharmacy 2, 3, 4, and 5.

A thorough review of the work covered in 2, 3, 4, and 5.

8. IDENTIFICATION OF INORGANIC OFFICIAL PREPARATIONS

MR. BACHMAN

One credit (eighteen hours) Second and third quarters, first year
The study of the physical properties of official preparations.

9. CHEMICAL PHILOSOPHY

PROFESSOR WULLING

One and one-half credits (twenty-seven hours lecture)

First quarter, first year

Treats of the principles underlying chemistry, and endeavors to elucidate chemical facts and phenomena. The subject is divided into—chemical statics, embracing the study of the theories of atoms and molecules, atomic weights, atomic and

molecular volume, quantivalence, molecular structure, ions, electric qualities, etc., and—chemical dynamics, the study of reactions and their equations, thermics, chemical properties in general, etc.

10. THE PHARMACEUTICAL CHEMISTRY OF THE NON-METALS AND THEIR PREPARATIONS
 PROFESSOR WULLING
 One and one-half credits (twenty-seven hours lecture)
 Second quarter, first year
 Prerequisite, pharmacy 9.
11. PHARMACOPOEIAL INORGANIC SALTS AND THEIR OFFICIAL PREPARATIONS
 PROFESSOR WULLING
 Three credits (fifty-four hours lecture)
 Third and fourth quarters, first year
 Prerequisites, pharmacy 10.
 Especial reference to description, properties and manufacture.
12. CLASSIFICATION OF PHARMACOPOEIAL ORGANIC COMPOUNDS
 PROFESSOR WULLING
 One credit (eighteen hours lecture)
 Third quarter, first year
 A preparation for pharmacy 13.
13. CHEMISTRY OF THE PHARMACOPOEIAL ORGANIC COMPOUNDS AND THEIR PREPARATIONS
 PROFESSOR WULLING
 Three credits (fifty-four hours lecture)
 First, second, and third quarters, second year
 Prerequisite, pharmacy 12.
 This course includes the critical study of cellulin and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes, and animal fats, alkaloids, glucosides, animal drugs and products, etc.
14. PHARMACOPOEIAL TESTING
 PROFESSOR WULLING, MR. BACHMAN
 AND ASSISTANTS
 Five credits (thirty-six hours lecture, one hundred eight hours laboratory)
 First quarter, second year
 A critical study of the identity, purity, limit and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound.
15. QUANTITATIVE ANALYSIS OF U. S. P. SALTS AND PREPARATIONS
 PROFESSOR WULLING AND MR. BACHMAN
 Two credits (eighteen hours lecture, thirty-six hours laboratory)
 Third quarter, second year
 Prerequisites, chemistry 3 and pharmacy 14.
 This course includes the gravimetric, volumetric and gasometric determinations of the U. S. Pharmacopoeia, but not pharmaceutical assay work (20).
16. INCOMPATIBILITY
 PROFESSOR WULLING AND MR. BACHMAN
 One-half credit (nine hours lecture)
 Second and third quarter, second year
 Therapeutic, pharmaceutical and chemical incompatibility is taken up in lecture and recitation work preliminary to 17.
17. DISPENSING
 PROFESSOR WULLING AND MR. BACHMAN
 Five and one-half credits (twenty-seven hours lecture, one hundred forty-four hours laboratory)

- Third and fourth quarters, second year
 Prerequisite, pharmacy 16.
 The study of the prescription and practical work in dispensing upwards of one hundred typical prescriptions
18. MANUFACTURE OF OFFICIAL ORGANIC AND INORGANIC SALTS AND PREPARATIONS PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT
 Four and one-third credits (twenty-four hours lecture, one hundred eight hours laboratory) Second quarter, second year
 The preparation of about forty official salts included in the course.
19. NATIONAL FORMULARY PROFESSOR WULLING AND MR. BACHMAN
 One credit (six hours lecture, twenty-four hours laboratory) Second and third quarters, second year
 This course includes the study of the National Formulary and the making of one or more members of each class of preparations.
20. PHARMACEUTICAL ASSAY PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT
 One and one-third credits (six hours lecture, thirty-six hours laboratory) Fourth quarter, second year
 Prerequisites, pharmacy 14 and chemistry 3.
 The quantitative determination of active constituents of a number of the potent organic drugs and preparations.
21. SYNTHETIC REMEDIES PROFESSOR WULLING
 One-third credit (six hours lecture) Fourth quarter, second year
 Prerequisites, pharmacy 12 and 13 and chemistry 4.
 A study of the chemistry of synthetic remedies in medical use.
22. HOMEOPATHIC PHARMACY PROFESSOR WULLING AND MR. BACHMAN
 Fourth quarter, second year.
 A brief exposition of the principles underlying homeopathic medication with some laboratory work.
23. IDENTIFICATION OF SALTS MR. BACHMAN
 One and one-half credits (fifty-four hours laboratory) Second semester, first year and entire second year
 The study of the physical identity of the more important official inorganic and organic salts.
24. MICRO-CHEMISTRY PROFESSOR WULLING
 Fourth quarter, second year. (Optional)
 A brief course is provided for seniors if time permits.

CHEMISTRY

GEORGE B. FRANKFORTER, M.A., Ph.D., *Dean of the School of Chemistry*
Professor of Chemistry

CHAS. F. SIDENER, B.S., *Professor of Quantitative Chemistry*

EVERHART P. HARDING, M.S., Ph.D., *Assistant Professor of Chemistry*

IRA HARRIS DERBY, B.S., *Assistant Professor of Chemistry*

JOHN A. HANDY, Ph.C., *Instructor in Chemistry*

1. GENERAL CHEMISTRY PROFESSOR DERBY AND MR. HANDY
 Five credits (forty-five hours lecture, ninety hours laboratory) First quarter, first year

This course includes a study of the chemical properties of the metallic and non-metallic elements.

2. **QUALITATIVE ANALYSIS** PROFESSOR DERBY AND MR. HANDY
Five credits (forty-five hours lecture, ninety hours laboratory)
Second quarter, first year
Prerequisites, chemistry 1.
This course covers the common reactions of the metals and acids and their qualitative separation. The ionic theory and the law of mass action are discussed with especial reference to qualitative reactions.
3. **QUANTITATIVE ANALYSIS** PROFESSOR SIDENER AND ASSISTANT
Four and one-half credits (twenty-seven hours lecture, one hundred eight hours laboratory)
Second quarter, second year
Prerequisites, chemistry 1 and 2.
A study of the principles of quantitative estimation; gravimetric, volumetric and gasometric.
4. **TOXICOLOGY, WATER AND FOOD ANALYSIS** PROFESSORS FRANKFORTER, DERBY AND HARDING
Three and one-half credits (twenty-seven hours lecture, seventy-two hours laboratory)
Second quarter, second year
The chemistry of the atmosphere, water, soil, etc.; the sanitary examination of air and water.
5. **ORGANIC CHEMISTRY** PROFESSORS FRANKFORTER, DERBY AND MR. HANDY
Nine and one-half credits (seventy-two hours lecture, one hundred ninety-eight hours laboratory)
Third and fourth quarters, first year
This course includes work in both the aliphatic and aromatic series and the preparation of the more important compounds.

BOTANY AND MICROSCOPY

FREDERICK E. CLEMENTS, Ph.D., *Professor of Botany*

FREDERICK K. BUTTERS, M.S., *Instructor in Pharmaceutical Botany and Microscopy*

.....Assistant

1. **COMPARATIVE MORPHOLOGY OF THE CRYPTOGAMS** PROFESSOR CLEMENTS, MR. BUTTERS
Four credits (thirty-six hours lecture, seventy-two hours laboratory)
First year
The course embraces the comparative morphology of the cryptogams. Especial attention is paid to the green algae, the foundation of the vegetable kingdom. The other groups of algae and the fungi are briefly treated, particular stress being laid on their economic relations to other plants, to animals and to man. About one-half of the semester is devoted to the study of the archegoniate series of plants. Numerous examples of liverworts, mosses, ferns, and their allies are studied in the laboratory, and the line of development which leads from the algae through the archegoniate series to the seed plants is emphasized.

2. THE MORPHOLOGY AND ANATOMY OF THE HIGHER SEED PLANTS

PROFESSOR CLEMENTS AND MR. BUTTERS

Four credits (thirty-six hours lecture, seventy-two hours laboratory)

Prerequisite, botany 1.

In this course especial attention is paid to vegetable histology.

The characteristic plant tissues are examined, and their arrangement is noted in roots, stems, leaves, fruits and seeds. The formation and occurrence of carbo-hydrates, glucosides, alkaloids, organic acids, resins, gums, gum-resins and oleo-resins are carefully studied.

3. MICRO-BOTANY

MR. BUTTERS

Designed to furnish practical training in the use of the microscope, in the preparation of material for microscopic examination, including the use of micro-chemical reagents, and in the representation by drawings of all structures observed.

The work of this course is co-incident with that of 2 and 3.

These courses occupy the equivalent of six and one-half hours a week throughout the junior year. They aim to give a comprehensive and scientific view of the vegetable kingdom, to lay a broad foundation for the study of pharmacognosy. Throughout the course attention is frequently directed in the lectures to the wider relations of plants to one another and to animals, and to the discussion of the plant as a living unit, thus bringing before the class the fundamental problems of plant physiology and ecology.

The successful completion of the course in botany is prerequisite to the study of pharmacognosy.

PHARMACOGNOSY

.....*Professor of Pharmacognosy*

FREDERICK K. BUTTERS, M.S., *Instructor in Pharmacognosy*

.....*Assistant*

1. CRUDE VEGETABLE DRUGS

MR. BUTTERS

Seven credits (fifty-four hours lecture, one hundred forty-four hours laboratory) Second, third, and fourth quarters, second year

Prerequisites, Botany 1, 2, and 3.

The vegetable drugs of the United States Pharmacopœia are taken up in the following order: Roots, rhizomes, tubers and bulbs, woods, barks, leaves, herbs and flowers, fruits, seeds, plant exudations, resins, gum-resins, waxes and starches. Each drug is carefully examined, both macroscopically and microscopically. Students are also provided with specimens for home study. The lectures give, in compact form, the history and important features of each drug, with consideration of its importance to the pharmacist. The quizzes include careful drill on the constituents, action and dose and official preparation of each drug considered. Identification receives careful attention and there are weekly tests of the student's ability. A short course is given in the microscopic examination of some of the more important alkaloids and glucosides, and of certain emulsions and inorganic salts, if time permits.

The drugs are considered in the following order:

Roots—Sarsaparilla (Mexican, Para and Honduras), senega, gentian, taraxacum, pyrethrum, inula, lappa, apocynum, stillingia, sumbul, asclepias, physalocca, althæa, belladonna, bryonia, calumba, rheum, glycyrrhiza, (Spanish and Russian), ipecacuanha, pareira, krameria, rumex.

Rhizomes—Aspidium, zingiber (Jamaican, East Indian and African), calamus, veratum viride, iris, cypripedium, convallaria, tritium, sanguinaria, geranium, podophyllum, valeriana, arnica, serpentaria, spigelia,

hydrastis, caulophyllum, cimicifuga, leptandra, gelsemium, menispermum.

Tubers and Bulbs—Jalapa, aconitum, colchicum, scilla, allium.

Twigs and Woods—Quassia, hæmatoxylon, santalum rubrum, guaiacum, dulcamara.

Barks—Cinchona (Rubra et Flava), prunus virginiana, vilburnum prunifolium, viburnum opulus, rubus, quercus alba, granatum, aspidosperma, frangula, rhamnus purshiana, juglans, xanthoxylum, mezereum, gossypii radix, euonymus, quillaja, ulmus, sassafras, cascarilla, cinnamomum (Ceylon, Saigon and cassia).

Leaves and Leaflets—Pilocarpus, eucalyptus, uva ursi, senna (Alexandria and India), coca (Bolivian and Truxilla), belladonna, stramonium, hyoscyamus, tabacum, digitalis, matico, salvia, hamamelis, castanea, eriodictyon, chimaphila, buchu (long and short), rhus toxicodendron.

Herbs and Flowers—Santonica, caryophyllus, sambucus, calendula, cusso, arnica, matricaria, anthemis, rosa gallica, rosa centifolia, crocus, zea, chondrus, cetraria, cannabis indica, pulsatilla, scoparius, eupatorium, grindelia, tanacetum, artemisia, absinthium, lobelia, mentha piperita, mentha viridis, melissa, hedeoma, marrubium, scutellaria, chirata, sabina, chelidonium.

Fruits—Humulus, piper (longum, nigrum et album), cubeba, pimenta, rhus glabra, capsicum, colocynthis, cassia fistula, chenopodium, illicium, cardamomum, vanilla, coriandrum, conium, anisum, carum, feniculum (Roman and German), macis, aurantii amari cortex, aurantii dulcis cortex, limonis cortex, prunum, tamarindus (East and West Indian). phytolacca, ficus, rubus.

Seeds—Physostigma, amygdala (dulcis et amara), pepo, myristica, sinapis (alba et nigra), nux vomica, staphisagria, ricinus, tiglium, stramonium.

Miscellaneous—Guarana, lactucarium, alce (Socotrina, Barbadiensis, et Capensis), catechu, kino (Malabar et Pallas), opium, elastica, manna, saccharum, saccharum lactis, mel, acacia, tragacantha, mastiche, guaiacum, benzoinum, cambogia, asafetida, ammoniacum, scammonium, myrrha, copaiba, terebinthina, terebinthina canadensis, resina, pix (Burgundica et liquida), styrax, balsamum peruvianum, balsamum toltutanum, camphora, thymol, menthol, ergota (Spanish and German), sassafras medulla, galla (Aleppo et Chinenensis), gossypium purificatum, kamala, lupulinum, lycopodium, amyllum, cetaceum, cera, cantharis, coccus, ichthyocolla, moschus, carbo animalis.

Besides the foregoing, a number of the more important unofficial drugs will also be discussed.

2. POWDERED DRUGS

MR. BUTTERS AND ASSISTANT

One credit (nine hours lecture, twenty-seven hours laboratory)

Fourth quarter, second year

Prerequisite, pharmacognosy 1.

This course consists of laboratory work and occasional lectures.

The more important vegetable drugs are examined microscopically, in powdered form. Especial attention is paid to the identification of unknown powders, and to the detection of the various forms of sophistication to which powdered drugs are subject.

MATERIA MEDICA AND THERAPEUTICS

E. D. BROWN, Pharm.D., M.D., *Acting Professor of Materia Medica and Therapeutics*

W. D. SHELDON, M.D., *Instructor in Therapeutics*

.....*Assistant in Materia Medica*

1. INORGANIC MATERIA MEDICA

PROFESSOR BROWN AND ASSISTANT

2. ORGANIC MATERIA MEDICA PROFESSOR BROWN AND ASSISTANT
Five credits (ninety hours lecture and recitation)

Third and fourth quarters, first year

The work in inorganic and organic materia medica is based principally on the U. S. P., but unofficial and synthetic drugs are also studied. The course includes the study of the general characteristics of drugs and of physiological action. Pharmacodynamics, including the study of the identity and quality of drugs, shares attention in the course of pharmacognosy.

3. THERAPEUTICS PROFESSOR BROWN AND DOCTOR SHELDON
One credit (eighteen hours lecture and recitation)

Third quarter, second year

Prerequisites, materia medica 1 and 2.

In this course drugs are studied in groups, as governed by their physiologic action, and the therapeutic features of such groups are described. Remedial measures other than those depending upon drugs, are fully considered.

PHYSIOLOGY

RICHARD O. BEARD, M.D., *Professor of Physiology*

M. R. WILCOX, M.D., *Professor of Physiology*

JULIUS PARKER SEDGWICK, B.S., M.D., *Instructor in Physiological Chemistry*

1. PHYSIOLOGY, ANATOMY AND HISTOLOGY . . . PROFESSORS BEARD AND WILCOX
Four and one-half credits (eighty-one hours lecture and recitation) Third quarter, first year

- I. The work covers the study of the physiological properties of the cell, the nutritive media, the nervous mechanisms in general, muscular tissues, connective tissues and epithelial tissues. The subjects of anatomy and histology are touched upon sufficiently to lay the foundation for the proper understanding of physiological functions.

Special demonstrations are given upon animals and the living subject, illustrating the physiological functions in the muscular, nervous, vascular, respiratory and glandular systems, special attention being directed to the action of drugs and their effects upon the various systems.

2. QUALITATIVE AND QUANTITATIVE URANALYSIS (Post-Graduate)
PROFESSOR BEARD AND DR. SEDGWICK
One credit (nine hours lecture, eighteen hours laboratory)

Second semester

Prerequisite, Physiology 1.

Lectures, recitations and laboratory work. The laboratory work includes the qualitative analysis of representative specimens of urine as regards their physical properties, inorganic and organic constituents, as well as the quantitative determination of chlorides, urea, ammonia, total nitrogen, sugar and albumin, together with the preparation of reagents.

3. EXPERIMENTAL PHYSIOLOGY (Post-Graduate) PROFESSORS BEARD AND WILCOX
Four credits (thirty-six hours lecture, seventy-two hours laboratory) Second semester

Prerequisite, physiology 2.

Laboratory work and demonstrations. A study of physiologic apparatus, electric stimuli and methods of experimentation;

the demonstration and performance of experiments which illustrate physiologic function in the muscular, nervous, vascular, respiratory and glandular systems; and the study of the cardiac areas, the heart and respiratory sounds, and of pulse tracings including training in the use of sphygmograph, the stethoscope, phonendoscope, etc.

4. PHYSIOLOGICAL CHEMISTRY AND MICROSCOPY (Post-Graduate)

PROFESSORS BEARD AND WILCOX AND DR. SEDGWICK

Eight credits (seventy-two hours lecture, one hundred forty-four hours laboratory)

First semester

Prerequisite, physiology 3.

Laboratory work and demonstrations. A practical study of the several classes of proteids; of carbohydrates, fats, muscle and bone; of gastric juice, saliva, pancreatic juice and bile in their respective digestions; of glycogen, and of blood lymph, chyle and milk. Microscopic study of the carbohydrates in vegetable and animal forms; of the physiologic emulsions of fat; of the crystalline waste products, and of the physiologic conditions of the blood cells and of blood crystals. Practical instruction is given during this course in the enumerations of the blood cells, in the estimation of hæmoglobin and of the corpuscles in mass, in the spectroscopic examination of the blood in the determination of blood tests, and in the use of the polariscope.

PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY

1. MINERALOGY

MR. GROUT

One credit (eighteen hours lecture)

First quarter, second year

Prerequisite.

A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relations.

2. CRYSTALLOGRAPHY

MR. GROUT

One credit (eighteen hours lecture)

Second quarter, second year

Prerequisite, mineralogy 1.

A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks.

PHARMACEUTICAL JURISPRUDENCE

1. LAW FOR PHARMACISTS

PROFESSOR WULLING

Two-thirds credit (twelve hours lecture)

Fourth quarter, second year

The lectures introduce the subjects of contracts, agency, commercial paper, insurance, and discuss the liability of retail and manufacturing pharmacists, etc.

FIRST AIDS TO THE INJURED

1. EMERGENCY CASES

DR. MCCLOUD

Two-thirds credit (twelve hours lecture)

Third quarter, second year

A series of lectures designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician.

BACTERIOLOGY

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of bacteria will be dealt with. The classification of the various bacterial forms, the methods of isolation and culture and

the composition and manufacture of culture media will be studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken.

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, will be thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water will form an important part of the work. Eighteen hours per week during the last eight weeks of the second semester, second year.

PROFESSOR WESBROOK, DR. CHOWNING.

This course is optional with students of pharmacy at present, but may be made obligatory.

CLINICAL MICROSCOPY

Instruction includes (a) the macroscopical study of urine, its colors, sediments, and finer chemical tests; (b) the microscopical study of urinary sediments, including blood, pus, epithelial cells, casts, etc.; (c) the macroscopical and microscopical study of sputum, including the study of sputa from cases of pneumonia, pulmonary tuberculosis, asthma, chronic bronchitis, etc.

Lectures and laboratory work. Eight hours weekly; last third, second semester, second year.

(Post-Graduate.)

DR. GEORGE DOUGLAS HEAD.

MINNESOTA PHARMACY LAW

Several lectures elucidating the rights, duties, privileges and liabilities of pharmacists under the state law regulating the practice of pharmacy, are given by special lectures near the close of the second year.

SPECIAL LECTURES

From eight to twelve special lectures on subjects related to the practice of pharmacy are delivered by well-known pharmacists of the state at intervals during the college year.

DISPENSARY PRESCRIPTION PRACTICE

The dispensing department of the University Free Dispensary at 1810 Washington Avenue South has lately been placed in charge of the College of Pharmacy, Mr. G. Bachman having supervision. The senior students are sectioned into classes of three for the purpose of doing practical prescription work at the dispensary under the direction of Mr. Bachman or Mr. Blosmo. The dispensary practice continues throughout the college year.

LECTURE AND LABORATORY SCHEDULES

The work of the regular course for 1908-'09 will be somewhat augmented, but the herewith schedule of the past year will be adhered to as far as possible. The necessary changes will be posted on the college bulletin in September.

The college year is divided into four quarters, the first and second constituting the first semester and the third and fourth, the second semester. The college year covers nine full months or thirty-eight weeks. Each quarter consists of nine working weeks.

FIRST SEMESTER—JUNIOR AND SENIOR SCHEDULE.

FIRST QUARTER, 9 WEEKS. SEPT. 15 TO NOV. 14.																	SECOND QUARTER, 9 WEEKS. NOV. 16 TO JAN. 30.																
1908	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30									8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30									
MON.	Botany Laboratory				Pharmaceu- tical Chemistry	General Chemistry								Pharmaceutical Laboratory								Qualitative Chemistry											
	Botany Lecture	Pharm. Chemistry					General Chemistry				Botany Laboratory				Pharm. Chemistry	Qualitative Chemistry																	
WED.	Botany Laboratory				Pharm. Chemistry	Chem. Recitation								Pharmaceutical Laboratory								Recitation											
THUR.	Botany Lecture	Pharm. Chemistry					General Chemistry								Botany Laboratory								Pharm. Chemistry	Qualitative Chemistry									
FRI.	Botany Laboratory				Pharm. Chemistry	General Chemistry								Pharmaceutical Laboratory								Qualitative Chemistry											
SAT.	Make up Laboratory																																
MON.	U. S. P. Testing				Dispensing													Pharmacognosy Laboratory								Toxicology, Food & Water							
TUES.	U. S. P. Testing				Dispensing													Operative Pharmacy								Operative Pharmacy							
WED.	Organic Pharm.	Identifi- cation	Mineral. and Crystall.	Pharmacog- nosy Lecture	Pharma. Labor.				Organic Pharm.				Identifi- cation	Mineral. and Crystall.	Pharma- cognosy Lecture	Toxicology, Food & Water																	
THUR.	U. S. P. Testing				Dispensing													Operative Pharmacy								Operative Pharmacy							
FRI.	U. S. P. Testing				Dispensing													Pharmacognosy Laboratory								Toxicology, Food & Water							
SAT.	Make up Laboratory																																

On Saturday mornings the pharmaceutical laboratory is open for the benefit of students who for sufficient reason may be behind in their laboratory work.

SECOND SEMESTER—JUNIOR AND SENIOR SCHEDULE.

THIRD QUARTER. Feb. 2 to April 3.

FOURTH QUARTER. April 5 to June 5.

1909 .	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30
MON.	Materia Medica		Physiology		Organic Chemistry				Materia Medica		Botany Laboratory				Organic Chemistry	
TUES.	Pharm. Chemistry	Materia Medica	Pharmaceutical Laboratory		Organic Chemistry				Pharm. Chemistry	Materia Medica	Pharmaceutical Laboratory				Organic Chemistry	
WED.	Materia Medica		Physiology		Organic Chemistry				Materia Medica		Botany Laboratory				Organic Chemistry	
THUR.	Pharm. Chemistry	Materia Medica	Pharmaceutical Laboratory		Organic Chemistry				Pharm. Chemistry	Materia Medica	Pharmaceutical Laboratory				Organic Chemistry	
FRI.	Materia Medica		Physiology		Organic Chemistry				Materia Medica		Botany Laboratory				Organic Chemistry	
SAT.			Make up Laboratory							Make up Laboratory						
MON.		Quantitative Chemistry			Pharm. Labor.				First Aids	Law	Therapeutics				Pharmaceutical Laboratory	
TUES.		Pharmacognosy Laboratory	Organic Pharmacy		Pharm. Labor.					Pharmacognosy Laboratory		Identification			Pharmaceutical Laboratory	
WED.		Quantitative Chemistry			Pharm. Labor.				Organic Pharmacy	New Remedies	Therapeutics				Pharmaceutical Laboratory	
THUR.		Pharmacognosy Laboratory	Organic Pharmacy		Pharm. Labor.					Pharmacognosy Laboratory		Identification			Pharmaceutical Laboratory	
FRI.		Quantitative Chemistry			Pharm. Labor.				First Aids	Law	Therapeutics				Pharmaceutical Laboratory	
SAT.			Make up Laboratory							Make up Laboratory						

Pharmaceutical laboratory work includes U. S. P. and N. F. preparations, the manufacture of some U. S. P. salts, assay, and homeopathic pharmacy. Quantitative analysis includes gravimetric, volumetric, and gasometric determinations.

Students

JUNIOR PHARMACISTS

- Bradley, Gaylord F., Paynesville.
 Budde, Emil M., Rochester.
 Bugbee, Guy C., Paynesville.
 —Cochrane, Edith C., St. Paul.
 Colby, Hans C., Jackson.
 —Constance M. Ryan, Sister.
 St. Josephs Hospital, St. Paul.
 Courtney, John F., Belle Plaine.
 Doerr, Harry, Minneapolis.
 —Elizabeth M. McGolrick, Sister,
 St. Josephs Hospital, St. Paul.
 Emmans, Floyd H., Minneapolis.
 Erickson, William A., Cashton, Ws.
 Fratzke, Theodore W., Eyota.
 Glass, Philip A., River Falls, Wis.
 —Gjerdingen, Nathalia L., Halstad.
 Hamilton, Horace L., St. Louis Park.
 Hanson, Harry, Rochester.
 Hanson, William C., Sleepy Eye.
 Hare, Joseph Jr., Bismarck, N. D.
 Hawlish, Joseph E., Hopkins.
 Hohn, Walter G., St. Paul.
 James, Chas. W., Rochester.
 Kellam, Ansel B., Heron Lake.
 Kelly, Chas. F., Webster, S. D.
 Kleihuizen, Albert E., Raymond.
 —Lyman, Emily L., Ia.
 Leikvold, Albert, Waterville, Ia.
 Levinson, Irving M., Seattle, Wash.
 Majerus, John, Helena, Mont.
 —Mathewson, Vera Mae, Minneapolis.
 —Maxwell, Hazel, St. Paul.
 —Meadowcroft, Grace, Ruso, N. D.
 Michael, Joseph C., Jordan.
 Munroe, Will R., Cummings, N. D.
 Nelson, Rex G., New Richland.
 Orr, Merton J., Bismarck, N. D.
 Parker, Claude H., Minneapolis.
 Paulson, Carl M., Minneapolis.
 Peterson, Hugo O., Minneapolis.
 —Peyton, Agnes, Wheaton.
 —Ponthan, Marie Wilhelmina,
 St. Paul.
 Reiersen, Carl R., Spring Grove.
 Root, Nelson W., Elysian.
 Samuels, Harvey C., Minneapolis.
 Shima, Ryujen, Otaro, Rokkaido,
 Japan.
 Sievert, Arthur F., New Richland.
 Slawson, Frank W., Graceville.
 —Snyder, Bessie E., Hector.
 Speidel, Harry W., Ladysmith, Wis.
 Spellman, Clyde A., Montevideo.
 Spengler, Wm. M., St. Paul.
 Tyrholm, Harold A., New Richland.
 Wolf, George E., Olivia.
 Yamagishi, Kozo, Kobe, Japan.
 —Zalesky, Pauline B., St. Paul.

SENIOR PHARMACISTS

- Alcott, Dolph C., Lakefield.
 —Austin, Alberta J., Milbank, S. D.
 Becker, Frank A., Montgomery.
 Bowman, Fred M., Browns Valley.
 Buckman, Mark M., Little Falls.
 Breckenridge, John Y. Jr., Pine City.
 Carlson, Arthur E., Willmar.
 —Carlson, Helma A., Erskine.
 Casey, John A., Aitkin.
 —Caton, Mrs. Charlotte E.,
 Minneapolis.
 Cleveland, Zina, Northfield.
 De Witz, Frank A., Rochester.
 Diessner, Chas. O., Waconia.
 Doty, Archie C., Eyota.
 Dretchko, Alvin L., Winthrop.
 Earle, Fred W., Rochester.
 Eckstein, Arthur W., New Ulm.
 Eichstadt, John, Stewartville.
 Eriksenbrack, Earl S., Parkers Prairie.
 Green, Everhard, Hankinson, N. D.
 Gronvold, Bernt O., Kenyon.
 Gunderson, Alfred J., Pelican Rapids.
 —Heath, Marie J., Riga, N. D.
 Holmgren, George A., Breckenridge.
 Hooper, Archie J., Minneapolis.
 Hotvedt, Elmer L., Eau Claire, Wis.
 Jones, Edward P., Blue Earth.
 Kelly, John V., St. Paul.
 Klovstadt, Thomas, Milan.
 Kurth, Asa F., Hendricks.
 Kusterman, Frederick G., St. Cloud.
 Lafans, Alfred F., Minneapolis.
 Lambert, Ray R., Royalton.
 Lovdahl, Arthur E., Park Rapids.
 McMiller, Paul R., Carrington, N. D.
 —Nesse, Ella M., Mabel.
 Olverson, Oscar A., Clark, S. D.
 Pladson, Ingvald S., Glenwood.
 Puhl, Richard H., Menomonie, Wis.
 Schreiter, Norman C., Red Lake Falls.
 Stoppel, Ernest, Rochester.
 Van Campen, Harry, Alton.
 Weber, George C., Rochester.
 Welch, Leo S., Glencoe.
 Zender, Chas. H., Henry, S. D.



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1909-10

THE LIBRARY
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UNIVERSITY OF ILLINOIS

The
University of Minnesota
Bulletin

College of Pharmacy

1909-1910



Volume XII

April 20, 1909

No. 3

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THE REGISTRAR,

The University of Minnesota,

Minneapolis, Minnesota.



UNIVERSITY
OF
MINNESOTA
MINNEAPOLIS

100 0 100 200 300 400 500
SCALE OF FEET

CALENDAR FOR 1909-1910

1909

1910

JULY

S.	M.	T.	W.	T.	F.	S.
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4	5	6	7	8	9	10
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APRIL

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MAY

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JUNE

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University Calendar

1909-1910

THE UNIVERSITY YEAR

The University year covers a period of thirty-eight weeks beginning on the second Tuesday in September. Commencement day is always the second Thursday in June.

1909

Sept. 7	Tuesday	Registration begins
Sept. 7-12	Week	Entrance examinations, condition examinations, registration.
Sept. 14	Tuesday	First semester begins
Oct. 4	Monday	University Council meeting
Oct. 4	Monday	School of Agriculture session begins
Oct. 7	Thursday	Board of Regents meeting
Nov. 25	Thursday	Thanksgiving Day, recess three days
Dec. 6	Monday	University Council meeting
Dec. 14	Tuesday	Board of Regents meeting
Dec. 18	Friday	Holiday recess begins 5:40 P. M.

1910

Jan. 4	Tuesday	Holiday recess ends 8:30 A. M.
Jan. 22	Saturday	Semester examinations begin
Jan. 29	Saturday	Semester examinations close
Jan. 31	Monday	Registration for second semester closes
Feb. 1	Tuesday	Second semester begins
Feb. 12	Saturday	Lincoln's birthday, holiday
Feb. 22	Tuesday	Washington's birthday, holiday
March 25	Friday	Good Friday, recess two days
April 4	Monday	University Council meeting
May 5	Thursday	Board of Regents meeting
May 30	Monday	Decoration Day, holiday
May 31	Tuesday	Semester examinations begin
June 4	Saturday	Semester examinations close
June 5	Sunday	Baccalaureate service
June 6	Monday	University Council meeting
June 6	Monday	Senior class exercises
June 7	Tuesday	Phi Beta Kappa address 8:00 P. M.
June 7	Tuesday	Senior Promenade 9:00 P. M.
June 8	Wednesday	Alumni Day
June 8	Wednesday	Board of Regents meeting
June 9	Thursday	Thirty-eighth annual commencement
June 10	Friday	Summer vacation begins

PROGRAM—ENTRANCE EXAMINATIONS

1909-10

When entrance examinations are required this schedule will be followed.

Sept. 7	Tuesday	9 A. M.	Astronomy Botony Geology Chemistry Physiography Zoology
		2 P. M.	American Government History Political Economy Physics
Sept. 8	Wednesday	9 A. M.	English
		2 P. M.	German French Latin Scandinavian
Sept. 9	Thursday	9 A. M.	Elementary Algebra Commercial Geography
		2 P. M.	Higher Algebra
Sept. 10	Friday	9 A. M.	Plane Geometry
		2 P. M.	Solid Geometry

All candidates for examinations should report at the scheduled time in Room 13 Library Building.

The School Year for 1910-11 will begin Tuesday, September 13

The University

THE UNIVERSITY OF MINNESOTA comprises the following named schools, colleges and departments:

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE DEPARTMENT OF AGRICULTURE, including—

THE COLLEGE OF AGRICULTURE

THE SCHOOL OF AGRICULTURE

SHORT COURSE FOR FARMERS

THE DAIRY SCHOOL

THE CROOKSTON SCHOOL OF AGRICULTURE

THE COLLEGE OF LAW

THE COLLEGE OF MEDICINE AND SURGERY

THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY

THE COLLEGE OF DENTISTRY

THE COLLEGE OF PHARMACY

THE SCHOOL OF MINES

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF EDUCATION

THE GRADUATE SCHOOL

The Regents of the University have entrusted to their charge:

THE EXPERIMENT STATIONS, including—

THE MAIN STATION AT ST. ANTHONY PARK

THE SUB-STATION AT CROOKSTON

THE SUB-STATION AT GRAND RAPIDS

THE GEOLOGICAL AND NATURAL HISTORY SURVEY

Bulletins of these schools, colleges and departments may be obtained upon application to the University Registrar.

The Board of Regents

CYRUS NORTHROP, LL.D., MINNEAPOLIS *Ex-Officio*
The President of the University

The HON. JOHN LIND, MINNEAPOLIS 1914
The President of the Board

The HON. JOHN A. JOHNSON, ST. PETER *Ex-Officio*
The Governor of the State

The HON. C. G. SCHULZ, ST. PAUL *Ex-Officio*
The State Superintendent of Public Instruction

The HON. THOMAS WILSON, ST. PAUL 1915

The HON. A. E. RICE, WILLMAR 1915

The HON. B. F. NELSON, MINNEAPOLIS 1910

The HON. PIERCE BUTLER, ST. PAUL 1910

The HON. CHARLES A. SMITH, MINNEAPOLIS 1910

The HON. S. M. OWEN, MINNEAPOLIS 1913

The HON. W. J. MAYO, ROCHESTER 1913

The HON. HENRY B. HOVLAND, DULUTH 1914

C. D. DECKER, MINNEAPOLIS,
Secretary of the Board

Executive Officers

THE UNIVERSITY

CYRUS NORTHROP, LL. D., PRESIDENT
ERNEST B. PIERCE, B. A., REGISTRAR
JAMES T. GEROULD, B. A., LIBRARIAN
C. D. DECKER, PURCHASING AGENT
J. D. BREN, CASHIER

THE COLLEGES

JOHN F. DOWNEY, M.A., C. E., DEAN OF THE COLLEGE OF SCIENCE,
LITERATURE AND THE ARTS
FREDERICK S. JONES, M.A., DEAN OF THE COLLEGE OF ENGINEERING
AND THE MECHANIC ARTS
JOHN W. OLSEN, B.S., DEAN AND DIRECTOR OF THE DEPARTMENT OF
AGRICULTURE
WILLIAM S. PATTEE, LL.D., DEAN OF THE COLLEGE OF LAW
FRANK FAIRCHILD WESBROOK, M.A., M.D., C.M., DEAN OF THE
COLLEGE OF MEDICINE AND SURGERY
EUGENE L. MANN, B.A., M.D., DEAN OF THE COLLEGE OF HOMEO-
PATHIC MEDICINE AND SURGERY
ALFRED OWRE, D.M.D., M.D., DEAN OF THE COLLEGE OF DENTISTRY
FREDERICK J. WULLING, Phm.D., LL.M., DEAN OF THE COLLEGE OF
PHARMACY
WILLIAM R. APPLEBY, M.A., DEAN OF THE SCHOOL OF MINES
GEORGE B. FRANKFORTER, M.A., Ph.D., DEAN OF THE SCHOOL OF
CHEMISTRY
GEORGE F. JAMES, Ph.D., DEAN OF THE COLLEGE OF EDUCATION
HENRY T. EDDY, C.E., Ph.D., LL.D., DEAN OF THE GRADUATE SCHOOL

ADA L. COMSTOCK, M.A., DEAN OF WOMEN

The University Council

At the regular meeting of the Board of Regents of the University, May 31st, 1905, a University Council was established according to the following plan:

I. The name of the body shall be The University Council. It shall consist of the President of the University, the Deans of the various colleges and schools, one elected representative from each college or school for each 400 students or major fraction thereof, and one representative of the general alumni association.

II. The elected members shall serve for a period of one year. They shall be chosen from the various faculties at the time of the selection of standing committees. The representative of the general alumni association shall be chosen by that body at its annual meeting from among the alumni who are not members of the University.

III. The Council shall be authorized to—

a) Appoint the following committees or the faculty representation thereon:

The University auditing committee

The University press committee

The committee on athletics

The committee on University relations to other institutions of higher learning

The committee on health and sanitation

The committee on commencement and other University functions

The committee on catalogue, programs and courses of study

The committee on student entertainments and social affairs

And such other committees as the general University interests may require.

b) Receive reports from such committees and to make such recommendations as may be required.

c) Consider and act upon any matter of general University interest beyond the province of a single faculty which may be referred to it by the President of the University or any faculty.

IV. The Council shall hold stated meetings upon the first Monday of October, December, April and June, and such other meetings as the President of the University may call.

Representatives to the Council

The University

PRESIDENT CYRUS NORTHROP

The College of Science, Literature and the Arts

DEAN JOHN F. DOWNEY

PROFESSOR JOHN H. GRAY

PROFESSOR J. C. HUTCHINSON

PROFESSOR H. F. NACHTRIEB

PROFESSOR NORMAN WILDE

The College of Engineering and the Mechanic Arts

DEAN FREDERICK S. JONES

PROFESSOR GEORGE D. SHEPARDSON

The College and School of Agriculture

DEAN JOHN W. OLSEN

PROFESSOR HARRY SNYDER

PROFESSOR SAMUEL B. GREEN

The College of Law

DEAN WILLIAM S. PATTEE

PROFESSOR HENRY J. FLETCHER

The College of Medicine and Surgery

DEAN F. F. WESBROOK

PROFESSOR THOMAS G. LEE

The College of Homeopathic Medicine and Surgery

DEAN EUGENE L. MANN

The College of Dentistry

DEAN ALFRED OWRE

The College of Pharmacy

DEAN FREDERICK JOHN WULLING

The School of Mines

DEAN WILLIAM R. APPLEBY

The School of Chemistry

DEAN GEORGE B. FRANKFORTER

The College of Education

DEAN GEORGE F. JAMES

The Graduate School

DEAN HENRY T. EDDY

The Dean of Women

ADA L. COMSTOCK

The University Library

JAMES T. GEROULD

General Alumni Association

DAVID P. JONES

University Council Committees

The University Auditing Committee

PROFESSORS RASTALL, FLETCHER, SIGERFOOS, SPRINGER,
WASHBURN

The Committee on Athletics

PROFESSORS PAIGE, HARDING, D. P. JONES, LITZENBERG,
ROBINSON

The Committee on Grounds and Sanitation

PROFESSORS FLATHER, BASS, BRACKEN, FLETCHER, FRANKFORDER
RANDALL, WESBROOK

The Committee on Catalogue, Programs and Courses of Study

PROFESSORS GRAY, FLETCHER, A. E. HAYNES, JOHNSTON, SNYDER,
E. B. PIERCE

The Press Committee

PROFESSORS SCHAPER, BEACH, CONSTANT, JOHNSTON, ROBINSON

The Committee on Commencement and other University Functions

PROFESSORS NACHTRIEB, JAMES, KIRCHNER, PATTEE, RANDALL,
SCHLENKER, DR. SCOTT, WILDE

The Committee on Student Entertainments and Social Affairs

PROFESSORS FRANKFORDER, BASS, CLEMENTS, COMSTOCK, COOKE,
OWRE, PIKE

The Committee on University Relations to other Institutions of Higher Learning

PROFESSORS DOWNEY, BOTHNE, EDDY, GRAY, GREEN, JAMES,
LEE

The Committee on University Extension and University Lectures

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The College of Pharmacy

FACULTY

CYRUS NORTHROP, LL.D., President.

FREDERICK J. WULLING, Phm.D., LL.M., etc., Dean Professor of Pharmacology, Pharmaceutical Chemistry and Jurisprudence.

RICHARD O. BEARD, M.D., Professor of Physiology.

CHAS. F. SIDENER, B. S., Professor of Quantitative Chemistry.

GEORGE B. FRANKFORTER, M.A., Ph.D., Professor of Chemistry.

FRANK F. WESBROOK, M.A., M.D., C.M., Professor of Bacteriology.

EVERHART P. HARDING, M. S., Ph. D., Assistant Professor of Chemistry.

M. R. WILCOX, M. D., Assistant Professor of Physiology.

HIBBARD W. HILL, Assistant Professor of Bacteriology.

IRA HARRIS DERBY, B. S., Assistant Professor of Chemistry.

FREDERIC E. CLEMENTS, Ph.D., Professor of Botany.

E. D. BROWN, Pharm. D., M. D., Acting Professor of Materia Medica and Therapeutics.

..... Professor of Pharmacognosy

INSTRUCTORS AND ASSISTANTS

GUSTAV BACHMAN, Ph.C., Ph.M., Instructorⁱ in Pharmacy.

OSCAR BLOSMO, Ph. C., Assistant in Pharmacy.

FREDERICK K. BUTTERS, M. S., Instructor in Pharmaceutical Botany and Microscopy and Pharmacognosy.

EDWARD FIDLAR, B. A., M. B., Junior Demonstrator in Bacteriology.

FRANK F. GROUT, B. S., Instructor in Mineralogy.

JOHN A. HANDY, Ph. C., Instructor in Chemistry.

GEORGE D. HEAD, B. S., M. D., Instructor in Clinical Microscopy.

JOHN ELDON HYNES, Ph.C., Assistant in Clinical Microscopy.

ELMER L. HOTVEDT, Ph.B., Pharmacy Laboratory Assistant.

C. N. MCCLOUD, Phm. D., M. D., Lecturer on First Aids to the Injured.

J. P. SEDGWICK, B. S., M. D., Instructor in Physiological Chemistry.

W. D. SHELDON, M.D., Instructor in Therapeutics.

..... Instructor in Pharmaceutical Latin.

..... Assistant in Materia Medica.

..... Assistant in Pharmacognosy.

SPECIAL LECTURERS

W. A. FROST

STEWART GAMBLE

J. W. HARRAH

CHARLES H. HUHN

J. N. KIRBY

A. J. KLINE

C. B. MCCALL

HENRY MCCOLL

A. D. THOMPSON

E. A. TUPPER

THOMAS VOEGELI

ADMISSION

A—TO THE TWO-YEAR COURSE

While nearly all students enrolled in this college are graduates of full four-year high school courses, such a training prior to entrance is not obligatory at the present time. The requirements, however, are being raised gradually in such a way that soon they shall be a full high school preparation or an equivalent.

Applicants may be admitted without examination if they bring certificates of graduation from, or standing in, institutions of the collegiate grade or present other credentials showing that they have successfully completed the branches of study embraced in a full four-year high school course, or an equivalent, provided that among the branches completed are:

English, two years, including the principles of composition and practice in written expression.

Algebra, one year, elementary, up to beginning of higher algebra.

Geometry, one year, elementary.

Physics, one year, elementary.

Latin, two years: grammar, one year; Caesar (four books), one year.

- II. Other applicants must pass examinations in the branches above specified, i. e., in English, algebra, geometry, physics and Latin, or present satisfactory evidence of having completed these branches, for which substitutes cannot be accepted.

Students will be allowed to carry not more than two conditions which, however, must be removed before the final examinations in the first year subjects.

In certain cases credit is given for drug store experience.

B—TO THE THREE-YEAR COURSE

The minimum requirements for admission to the three-year course are the same as those for admission to the two-year course II., with the exception that students may carry as conditions not more than three of the entrance subjects among which English cannot be. Students must pursue the branches in which they are conditioned during their first year and pass examinations in them or present evidence of having satisfactorily completed the branches. The subjects are not taught at the college, but may be taken at the academy near by, or at the city high schools or with private tutors. The University Y. M. C. A. usually establishes courses for the benefit of students conditioned in entrance branches.

Applicants whose preparatory course of study has not conformed precisely to the requirements above enumerated will be allowed to offer, in lieu of a portion of these requirements, equivalent preparation in similar branches of study; and if they show, by examination, or by other

evidence, that their preparation has been substantially equivalent, such branches will be accepted as substitutes for those omitted.

The examinations for entrance are conducted by the faculty of the College of Pharmacy, in the pharmacognosy rooms, beginning at 9:00 a.m., on Tuesday, September 14, 1909. Lecture work begins as soon as possible after the examinations, usually the following day.

Every applicant is required to furnish a certificate of good moral character.

Those who do not pass the entrance examinations, may enter and complete their course in three years, provided they pursue the subjects required for admission in addition to the professional work that may be assigned to them, and pass their entrance examinations before the end of the first year.

REGISTRATION

All applicants for admission to the regular courses must present to the Dean not later than September 14, their school or high school certificates, diplomas or such other credentials as they may wish to offer toward meeting in whole or in part the entrance requirements. If these are found satisfactory the applicant will register in the office of the University Registrar, who will issue a card to the University Accountant to whom the applicant will pay the tuition and breakage fees and microscope rental and receive receipts therefor. Registration is completed by depositing these receipts in the office of the Dean. The student is then classified.

ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must pass the examinations of all departments in which they wish to be exempt, if such examinations are deemed necessary by the professors in charge. Students will not be permitted to substitute private work in any branch for the regular course work.

UNCLASSED STUDENTS

Unclassed or special students may enter at any time providing there is laboratory room for them. They will not be rated on their work nor examined unless they make special request therefor. Work completed will be credited should the student subsequently enter the regular course.

EXAMINATIONS AND STANDINGS

Examinations are held at the end of the regular school year and during the last week of the first semester, and are supplementary to the written tests and quizzes that are held at frequent intervals during the year, and with them form largely the basis of final determination of fitness

for promotion or graduation. Students are rated throughout the year, and all who have a standing of ninety per cent, or more in certain of the branches, may not be required to take the final examination in those branches.

Students are not required to write graduating theses, but instead they keep complete records of all their laboratory work. The records are to be kept in substantially bound books, to be approved by the faculty. The respective professors call for the records for inspection and rating once a month or oftener. Duplicates of records are to be furnished the college by the students. The college provides the paper.

The standing of students is determined by the results of recitations, written examinations, laboratory work and attendance. It is indicated by the terms "excellent," "passed," "conditioned," "incomplete," or "failed." Conditions may be removed as indicated below. Incomplete work must be made up before the final examinations of the following year.

In order to become eligible for final examinations, students are required to attend at least four-fifths of the lectures in each course. This rule is not intended for the benefit of those who seek admission after the opening of the college year, but is designed to cover cases of sickness or unavoidable absence. It does not apply to laboratory courses which must be taken in full and must be entered during the first week in which they begin.

Students having conditions in more than two major or in more than three minor subjects of the first year, cannot enter upon the second year's work. All entrance conditions must be removed before the next spring examination. Candidates for graduation must have removed all conditions before entering upon the second semester of the graduating year.

Condition examinations are held during the first week of the course in September. The dates are usually posted in June. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given.

All who carry a condition and fail to remove it within one year will be charged an extra examination fee.

Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

Absence will not be excused, unless satisfactory reasons are given to the professor in charge. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension. Students are earnestly requested to be present at the beginning of the school year, but those who cannot enter in the fall may enter at the beginning of the second semester taking any of the subjects beginning then. Any of the facilities for work in the University are open to the students of this college, subject

to the approval of the Dean. Opportunity is afforded to do advanced work in all branches. Text-books may be obtained after coming to the University.

The work of the college, as outlined in the following pages, is conducted by means of lectures, recitations and laboratory exercises. Students find their time fully occupied. Those who feel unable to complete the work in two years may divide it in a manner to complete it in three years. Practising pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities.

GRADUATION REQUIREMENTS

Regular attendance at lectures, recitations and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven-eighths of the required number of exercises.

Every person upon whom the degree is conferred must be of good moral character, and must be at least twenty-one years old; must have attended two full lecture and laboratory courses, the last at this college, and must have passed a successful examination in the subjects required for graduation.

Drug store experience is not a requirement for graduation.

Those who fail to appear for examination after having paid their diploma fee, or those who do not pass satisfactorily, will be permitted to present themselves at any subsequent examination upon payment of an additional fee of five dollars, and complying with all other requirements.

DEGREES

The college confers the degrees Bachelor of Pharmacy, Master of Pharmacy and Doctor of Pharmacy for the completion of respectively the regular and the two graduate courses.

FEES

TWO YEAR REGULAR COURSE

First year tuition.....	\$75.00	
Second year tuition.....	90.00	
		\$165.00

THREE YEAR REGULAR COURSE

First year tuition.....	\$55.00	
Second year tuition.....	55.00	
Third year tuition.....	55.00	
		\$165.00

FIRST GRADUATE COURSE

Tuition for the entire course.....	\$75.00	
Final Examination fee.....	10.00	
		\$85.00

There are no other tuition fees. Fees are payable at the time of registration. Those desiring to take special work will be required to pay an average of fifteen dollars a subject for the lecture courses and twenty-five dollars for the laboratory courses.

Students will be charged for laboratory material if used unreasonably. At the end of the laboratory courses students will be required to pay for breakage and damage to utensils in their care. If a student is careful this charge need not amount to more than two or three dollars. Students are to provide themselves with a designated set of metric weights, a set of apothecary's weights and steel spatulas. The expense of these is within three dollars. Students using platinum crucibles are charged for them. Upon the return of the crucible in the original condition the charge is cancelled; if the crucible is in any wise damaged the full value is collected from the student. A rental of two dollars per college year or fraction thereof is collected for use of a microscope. All money is payable to the University Accountant, who will give receipts which must be deposited in the Dean's office.

Fees will not be returned, except in case of discontinuance for sufficient reason before the student has been assigned to a place in the laboratory.

A deposit of ten dollars will be made with the Accountant each year, by every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage to or in the college buildings and of breakage and loss of laboratory apparatus and material. It will be returned to the student at the close of each year, minus the cost of articles assigned to him that he fails to return in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give receipt. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him. All apparatus lost or damaged will be charged to him, and must be paid for before he can receive credits for his course, or take his annual examinations.

COLLEGE TRAINING FOR PHARMACISTS

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In New York, Pennsylvania,

Hawaii, Wisconsin, Ohio and Louisiana, such training is obligatory either by law or by rule of the boards of pharmacy. In a number of other states credit is given for college work. In Minnesota graduates from recognized colleges need to have only two years of practical experience, while all others must have had four years of drug store experience before they become eligible for examination by the State Board of Pharmacy for full license to practice in Minnesota. Graduates of the three-year course who have gained practical experience concurrently with their college work need only one additional year of drug store experience before they become eligible for examination for full registration.

At the Joint Conference of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties, held at Indianapolis, Ind., in September, 1906, the following resolution was adopted:

"Special education for the practice of pharmacy is in this age a necessity and should as rapidly as possible be made compulsory. The rules of the boards of pharmacy are such as to promote and encourage it in all practicable ways. The special pharmaceutical education should include substantial laboratory courses." The training advocated by these two most representative bodies and by the American Pharmaceutical Association can be obtained only at colleges or schools of pharmacy of recognized standing. It is admitted that the State of Minnesota through its University College of Pharmacy is affording instruction of the most approved kind.

In the organization of this college the Board of Regents and the faculty have had the co-operation of the pharmacists of the state. The character of instruction is of high order and every effort is made to comply with the demands of the profession in the Northwest, or elsewhere, in the maintenance of a course of instruction of the highest grade.

POSITIONS FOR GRADUATES

The demand for graduates of this College has always been greater than the supply and is continually growing. The rule is that practically all of the senior class are engaged before graduation. This college is recognized in every state, including those in which standards of efficiency have been established, and its graduates are everywhere admitted to board examinations.

STATE BOARD OF PHARMACY

The State Board of Pharmacy meets at the College four times each year to examine candidates for registration. For information concerning the Board or State examinations address the Secretary of the Board, 502 Bank of Commerce Building, Minneapolis, Minn.

COLLEGE OF PHARMACY ALUMNI ASSOCIATION

The Alumni Association of the College of Pharmacy meets annually in the college building the day before commencement, at 3 p. m., Every member of the association is urgently requested to report change of address to the secretary.

THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

The College of Pharmacy of the University of Minnesota is one of the colleges constituting the membership of the American Conference of Pharmaceutical Faculties.

COMMUNICATIONS

Address communications to the Dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minn.

PHI DELTA CHI

The Theta chapter of the Phi Delta Chi fraternity was organized at the College of Pharmacy in 1902. Students of the college of high scholarship and character are eligible to membership.

PRIZES

Nominations for membership in the American Pharmaceutical Association and the first year's dues are offered annually by Dean Wulling and Mr. Bachman to each of the two students earning respectively the highest total average of standings and the highest standing in pharmacy.

N. W. BR. A. PH. A.

The Northwestern Branch of the American Pharmaceutical Association, composed of the representative pharmacists of the Northwest, has its headquarters at the College of Pharmacy. About six meetings are held annually. Pharmacy students are eligible to membership in the Branch, but are privileged to attend the meetings without becoming members.

Courses of Instruction

Three courses are offered, the regular and two graduate courses.

The complete regular course extends over two years of nine full months each. Students may arrange their work so as to take the course in three years. It is quite possible that three years attendance will be required of students in this college in the near future. The sixteenth annual course begins on September 14, 1909, on which day all students in pharmacy should register. The office of the Registrar is open for the purpose of registration as early as September 10th, but students must first report at the Dean's office in the pharmacy building.

In addition to the regular course this college offers two graduate courses, the first continuing through one college year and leading to the degree "Master of Pharmacy," and the second continuing through an additional year or longer, and leading to the degree "Doctor of Pharmacy." The first graduate course, the one leading to the master's degree, is now in operation. The curriculum includes higher pharmaceutical chemistry, pharmaceutical assaying, higher organic chemistry, proximate and ultimate analysis, chemistry of food, water analysis, toxicology, spectroscopic work, therapeutics, clinical microscopy and bacteriology, and a thesis of at least 3,000 words, embodying the results of original work, but this curriculum may be changed by the faculty if occasion or experience require.

The requirements for admission are a diploma from a Minnesota high school of the first grade, or an equivalent; a diploma from a college of pharmacy whose curriculum, extent and kind of work and length of undergraduate course are equal to those of the undergraduate work of this college; an acquaintance with either German or French sufficient to enable the student to read and understand the scientific literature of those languages. The fees for this course are seventy-five dollars, and an additional fee of ten dollars for final examinations. The rules relating to damage, waste and breakage in laboratories are the same as those applying to the undergraduate course.

The course leading to the doctor's degree will begin as soon as there are sufficient applicants.

PROPOSED NEW COURSES

Beginning as soon as the proposed enlarged quarters of the college permit, two additional courses will be instituted: the one a lower and shorter than the regular course to conform to the minimum requirements of the American Conference of Pharmaceutical Faculties; the other, a high-

er than the regular course to lead to the degree Bachelor of Science in Pharmacy, and to include four years of work. The details have not yet been worked out but it is probable that the former will include about two-thirds of the work of the regular course and will cover two years of at least six months each. Possibly opportunity will be offered to complete the work in twelve consecutive months but this is doubtful. The entrance requirements will include the first year in high school or equivalent training or whatever the entrance requirements of the Conference may be at the time.

The higher course will cover four years of nine months each and will include two years of academic and cultural work. The qualifications for entrance to this course will be the same as those required for entrance to the College of Science, Literature and the Arts. Those presenting evidence of having completed the first two years of a collegiate course may complete the course in two years, providing the collegiate work completed includes certain subjects in the sciences and mathematics. Full announcement regarding these courses will be made duly.

Courses of Instruction

COURSES OF INSTRUCTION COMPRISING THE REGULAR PHARMACY COURSE

The complete regular course extends over two years of nine full months each. Students may arrange their work so as to take the course in three years. It is quite possible that three years attendance will be required of students in this college in the near future. The sixteenth annual course begins on September 14, 1909, on which day all students in pharmacy should register. The office of the Registrar is open for the purpose of registration as early as September 10th, but students must first report at the Dean's office in the pharmacy building.

FIRST YEAR

FIRST QUARTER

Botany 1, eleven hours, Mr. Butters and Assistant
Pharmacy 9, five hours, Professor Wulling
Chemistry 1, fifteen hours, Professor Derby and Mr. Handy

SECOND QUARTER

Botany 1, six hours, Mr. Butters and Assistant
Pharmacy 10, three hours, Professor Wulling
Pharmacy 1, 2 and 3, twelve hours, Professor Wulling, Mr. Bachman,
Mr. Blossmo and Assistant
Chemistry 2, fifteen hours, Professor Derby and Mr. Handy

THIRD QUARTER

Pharmacy 11, two hours, Professor Wulling
Pharmacy 4, nine hours, Professor Wulling, Mr. Bachman, Mr. Blossmo
and Assistant
Pharmacy 7, one hour, Mr. Bachman
Materia Medica 1, three hours, Professor Brown and Assistant
Chemistry 5, fifteen hours, Professor Frankforter, Assistant Professor
Derby and Mr. Handy

FOURTH QUARTER

Pharmacy 11, two hours, Professor Wulling
Materia Medica 2, three hours, Professor Brown and Assistant
Pharmacy 5 and 6, six hours, Professor Wulling, Mr. Bachman, Mr.
Blossmo and Assistant

Pharmacy 7, two hours, Mr. Bachman
Pharmacy 8, one hour, Mr. Bachman
Botany 2 and 3, nine hours, Mr. Butters and Assistant
Chemistry 5, fifteen hours, Professor Frankforter, Assistant Professor
Derby and Mr. Handy

SECOND YEAR

FIRST QUARTER

Pharmacy 12, one hour, Professor Wulling
Pharmacy 13, two hours, Professor Wulling
Pharmacy 14, sixteen hours, Professor Wulling, Mr. Bachman, Mr. Blossmo
and Assistant
Mineralogy and Crystallography 1, one hour, Mr. Grout
Pharmacognosy 1, five hours, Mr. Butters and Assistant
Pharmacy 16 and 17, sixteen hours, Professor Wulling, Mr. Bachman and
Assistants
Pharmacy 23, one hour, Mr. Bachman
Physiology 1, two hours, Professor Beard and Wilcox.

SECOND QUARTER

Pharmacy 13, two hours, Professor Wulling
Mineralogy 2, one hour, Mr. Grout
Pharmacognosy 1, nine hours, Mr. Butters and Assistant
Pharmacy 18, sixteen hours, Professor Wulling, Mr. Bachman, Mr. Blossmo
and Assistant
Chemistry 4, nine hours, Professor Frankforter, Assistant Professors Derby
and Harding
Pharmacy 23, one hour, Mr. Bachman

THIRD QUARTER

Pharmacognosy 1, six hours, Mr. Butters and Assistant
Chemistry 3, sixteen hours, Professor Sidener and Assistant
Pharmacy 23, one hour, Mr. Bachman
Pharmacy 13, two hours, Professor Wulling
Pharmacy 19, fifteen hours, Professor Wulling, Mr. Bachman, Mr. Blossmo
and Assistant

FOURTH QUARTER

Pharmacy 15, five hours, Professor Wulling and Mr. Bachman
Pharmacy 13, one hour, Professor Wulling
Pharmacy 23, two hours, Mr. Bachman
Pharmacognosy 2, six hours, Mr. Butters
Pharmacy 20, 21, 22, 24, twenty hours, Professor Wulling, Mr. Bachman,
Mr. Blossmo and Assistant

Therapeutics 3, six hours, Professor Brown and Assistant
Pharmacy Law, one and one-half hours, Professor Wulling
First Aids, one and one-half hours, Dr. McCloud

THIRD YEAR

Students taking three years to do the work of the regular two-year course will divide the work in an equitable way subject to the approval of the Dean. Students are urged to devote three years to the completion of the course.

BACTERIOLOGY

1. GENERAL BACTERIOLOGY (POST GRADUATE) PROFESSOR WESBROOK
ASSISTANT PROFESSOR HILL, DR. MULLIN AND DR. FIDLAR

Nine credits (one hundred eight hours lecture and recitation, one hundred eight hours laboratory)

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of the bacteria will be dealt with. The classification of the various bacterial forms, the methods of isolation and culture and the composition and manufacture of culture media will be studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken here.

Laboratory work involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, will be thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water will form an important part of the work. Eighteen hours per week during the last eight weeks of the second semester, second year.

PROFESSOR WESBROOK, DR. CHOWNING

BOTANY AND MICROSCOPY

FREDERIC E. CLEMENTS, Ph.D., Professor of Botany

FREDERIC K. BUTTERS, M. S., Instructor in Pharmaceutical Botany and Microscopy

..... Assistant

Eight credits (seventy-two hours lecture, one hundred forty-four hours laboratory) First year

1. COMPARATIVE MORPHOLOGY OF THE CRYPTOGAMS PROFESSOR CLEMENTS,
MR. BUTTERS

The course embraces the comparative morphology of the cryptogams. Especial attention is paid to the green algae, the foundation of the vegetable kingdom. The other groups of algae and the fungi are briefly treated, particular stress being laid on their economic relations to other plants, to animals and to man. Examples of liverworts, mosses, ferns, and their allies are studied in the laboratory, and the line of development which leads from the algae through the archegoniate series to the seed plants is emphasized.

2. THE MORPHOLOGY, ANATOMY AND CLASSIFICATION OF THE HIGHER SEED PLANTS
 PROFESSOR CLEMENTS AND MR. BUTTERS

Thirty-six hours lecture, seventy-two hours laboratory

Prerequisite, botany 1

In this course especial attention is paid to vegetable histology. The characteristic plant tissues are examined, and their arrangement is noted in roots, stems, leaves, fruits and seeds. The formation and occurrence of carbo-hydrates, glucosides, alkaloids, organic acids, resins, gums, gum resins and oleo-resins are carefully studied. Considerable time is devoted to a study of the basis of classification of flowering plants and to the identification of plants in the field.

3. MICRO BOTANY

MR. BUTTERS

Designed to furnish practical training in the use of the microscope, in the preparation of material for microscopic examination, including the use of micro-chemical reagents, and in the representation by drawings of all structures observed.

The work of this course is co-incident with that of 2 and 3

These courses occupy the equivalent of six hours a week throughout the junior year. They aim to give a comprehensive and scientific view of the vegetable kingdom, to lay a broad foundation for the study of pharmacognosy. Throughout the course attention is frequently directed in the lectures to the wider relations of plants to one another and to animals, and to the discussion of the plant as a living unit, thus bringing before the class the fundamental problems of plant physiology and ecology.

The successful completion of the course in botany is prerequisite to the study of pharmacognosy.

CHEMISTRY

GEORGE B. FRANKFORTER, M.A., Ph. D., Dean of the School of Chemistry

Professor of Chemistry

CHAS. F. SIDENER, B.S., Professor of Quantitative Chemistry

EVERHART P. HARDING, M.S., Ph.D., Assistant Professor of Chemistry

IRA HARRIS DERBY, B.S., Assistant Professor of Chemistry

JOHN A. HANDY, Ph.C., Instructor in Chemistry

1. GENERAL CHEMISTRY

PROFESSOR DERBY AND MR. HANDY

Five credits (forty-five hours lecture, ninety hours laboratory)

First quarter, first year

This course includes a study of the chemical properties of the metallic and non-metallic elements.

2. QUALITATIVE ANALYSIS

ASSISTANT PROFESSOR DERBY AND MR. HANDY

Five credits (forty-five hours lecture, ninety hours laboratory)

Second quarter, first year

Prerequisites, chemistry 1

This course covers the common reactions of the metals and acids and their qualitative separation. The ionic theory and the law of mass action are discussed with especial reference to qualitative reactions.

3. QUANTITATIVE ANALYSIS

PROFESSOR SIDENER AND ASSISTANT

Four and one-half credits (twenty-seven hours lecture, one hundred eight hours laboratory)

Third quarter, second year

Prerequisites, chemistry 1 and 2

A study of the principles of quantitative estimation; gravimetric volumetric and gasometric.

4. TOXICOLOGY, WATER AND FOOD ANALYSIS (POST GRADUATE)

PROFESSORS FRANKFORTER, DERBY AND HARDING

Three and one-half credits (twenty-seven hours lecture, seventy-two hours laboratory) Second quarter, second year

The chemistry of the atmosphere, water, soil, etc.; the sanitary examination of air and water.

5. ORGANIC CHEMISTRY

PROFESSORS FRANKFORTER, DERBY AND MR. HANDY

Nine and one-half credits (seventy-two hours lecture, one hundred ninety-eight hours laboratory) Third and fourth quarters, first year

This course includes work in both the aliphatic and aromatic series and the preparation of the more important compounds.

CLINICAL MICROSCOPY

1. CLINICAL MICROSCOPY (POST GRADUATE) DR. GEO. D. HEAD AND DR. HYNES

Instruction includes (a) the macroscopical study of urine its colors, sediments, and finer chemical tests; (b) the microscopical study of urinary sediments, including blood, pus, epithelial cells, casts, etc.; (c) the macroscopical and microscopical study of sputum, including the study of sputa from cases of pneumonia, pulmonary tuberculosis, asthma, chronic bronchitis, etc.

Lectures and laboratory work. Eight hours weekly; last third, second semester, second year.

DISPENSARY PRESCRIPTION PRACTICE

The dispensing department of the University College of Medicine and Surgery Free Dispensary at 1810 Washington Avenue South has lately been placed in charge of the College of Pharmacy, Mr. G. Bachman having supervision. The senior students are sectioned into classes of three for the purpose of doing practical prescription work at the dispensary under the direction of Mr. Bachman or Mr. Blossmo. The dispensary practice continues throughout the college year.

FIRST AIDS TO THE INJURED

1. EMERGENCY CASES

DR. McCLLOUD

Two-thirds credit (twelve hours lecture)

Third quarter, second year

A series of lectures designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician.

MATERIA MEDICA AND THERAPEUTICS

E. D. BROWN, Pharm.D., M.D., Acting Professor of Materia Medica and Therapeutics

W. D. SHELDON, M.D., Instructor in Therapeutics

.....Assistant in Materia Medica

1. INORGANIC MATERIA MEDICA

PROFESSOR BROWN AND ASSISTANT

2. ORGANIC MATERIA MEDICA

PROFESSOR BROWN AND ASSISTANT

Six credits (one hundred and eight hours lecture and recitation)

Third and fourth quarters, first year

The work in inorganic and organic materia medica is based principally on the U. S. P., but unofficial and synthetic drugs are also studied. The course includes the study of the general characteristics of drugs and of physiological action. Pharmacodynamics, including the study of the identity and quality of drugs, shares attention in the course of pharmacognosy.

3. THERAPEUTICS

PROFESSOR BROWN AND DR. SHELDON

One credit (eighteen hours lecture and recitation)

Third quarter, second year

Prerequisites, materia medica 1 and 2

In this course drugs are studied in groups, as governed by their physiologic action, and the therapeutic features of such groups are described. Remedial measures other than those depending upon drugs, are fully considered.

PHARMACY

FREDERICK J. WULLING, Phm.D., LL.M., etc., Professor of Pharmacology

GUSTAV BACHMAN, Ph.C., Ph.M., Instructor in Pharmacy

OSCAR BLOSMO, Ph.C., Assistant in Pharmacy

F. A. STEINER, Laboratory Assistant

1. HISTORY OF PHARMACY

PROFESSOR WULLING

One-third credit (six hours lecture)

First quarter, first year

The history of the U. S. Pharmacopœia through all its revisions.

Dispensatories, text-books, and works of reference.

2. METROLOGY

PROFESSOR WULLING, MR. BACHMAN AND MR. BLOSMO

Two-thirds credit (twelve hours lecture)

First quarter, first year

Weights and measures, including metric system; balances—construction, varieties, methods of weighing; specific gravity in detail; specific volume, alligation, etc.

3. THE PHYSICS OF PHARMACY

PROFESSOR WULLING, MR. BACHMAN AND MR. BLOSMO

Two and one-half credits (eighteen hours lecture, fifty-four hours laboratory)

Second quarter, first year

Prerequisite, pharmacy 2.

Students are required to have had elementary physics before entering. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. Special attention is paid to heat. Specific heat; thermometers—the various scales, testing and comparing thermometers; combustion of solids, liquids and gases in various kinds of furnaces, stoves and burners; application of heat in drying ovens, steam, hot-air and water ovens; drying closets, desiccators, blow-pipes, crucibles; baths for controlling and equalizing heat; water-salt-oil-glycerine-paraffin-hot-air-baths; evaporation—spontaneous, rapid, slow, in vacuo; ebullition boiling points, fusion; sublimation, calcination, dehydration, torrefaction, roasting, reduction, oxidation; carbonization, deflagration, ignition, etc: solution—pharmaceutical simple, chemical, saturated; circulatory displacement; dialysis—construction of dialyser, osmosis, endosmosis, exosmosis; crystalloids and colloids, etc.

4. PHARMACEUTICAL PROCESSES

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT

Three and one-half credits (twenty-four hours lecture, seventy-two hours laboratory)

Second and third quarters, first year

Prerequisite, pharmacy 3.

The processes not taken up in 3, constitute the subjects of this course. In part they are: drug grinding and powdering; comminution; contusion; trituration; sifting; elutriation; levigation; lixiviation, filtration, filtering media, filtration of solutions oils, syrups, rapid filtration; filtration in vacuo, hot filtration, colation; washing—displacement, continuous; decantation—the syphon and its uses; precipitation—methods, vessels, separating, drying, weighing; granulation—granular effervescent salts; desiccation; exsiccation; crystallization—water of crystallization, deliquescence,

efflorescence; methods of obtaining crystals, collecting, draining, washing, drying crystals, fractional crystallization; distillation—stills, simple, fractional, destructive; extraction; maceration; expression percolation—history, theories, percolators, exhaustion, repercolation, continuous percolation, fractional percolation; clarification; decolorization.

5. PHARMACOPOEIAL PREPARATIONS

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT

Five credits (thirty hours lecture, one hundred twenty hours laboratory) third and fourth quarters, first year.

This course includes the study and preparation of official bodies for which the U. S. P. gives formulae and processes, and includes water, solutions, syrups, mucilages, spirits, infusions, decoction, tinctures, fluid extracts, vinegars, wines, liniments, oleates, ointments, cerates, resins, oleo-resins, honeys; glycerites, mixtures, emulsions, elixirs, collodions, pills, capsules, powders, suppositories, bougies, plasters, papers, cachets, etc.,

6. MATHEMATICS OF PHARMACY

PROFESSOR WULLING AND MR. BACHMAN

While students are required to have a preparation in arithmetic and algebra before entering, they receive frequent drills at stated hours and as occasion requires or suggests throughout the entire course. Students are required to take a final examination in the subject at the end of the first year, at which examination they must attain a rating of at least eighty per cent.

7. PHARMACY QUIZ

MR. BACHMAN

Three credits (fifty-four hours) Second, third and fourth quarters, first year

Prerequisite, pharmacy 2, 3, 4, and 5.

A thorough review of the work covered in 2, 3, 4, and 5.

8. IDENTIFICATION OF INORGANIC OFFICIAL PREPARATIONS

MR. BACHMAN

One credit (eighteen hours)

Second and third quarters, first year

The study of the physical properties of official preparations.

9. CHEMICAL PHILOSOPHY

PROFESSOR WULLING

One and one-half credits (twenty-seven hours lecture) First quarter, first year

Treats of the principles underlying chemistry, and endeavors to elucidate chemical facts and phenomena. The subject is divided into—chemical statics, embracing the study of the theories of atoms and molecules; atomic weights; atomic and molecular volume, quantivalence molecular structure, ions, electric qualities, etc., and—chemical dynamics, the study of reactions and their equations, thermics, chemical properties in general, etc.

10. THE PHARMACEUTICAL CHEMISTRY OF THE NON-METALS AND THEIR PREPARATIONS

PROFESSOR WULLING

One and one-half credits (twenty-seven hours lecture)

Second quarter first year

Prerequisite, pharmacy 9.

11. PHARMACOPOEIAL INORGANIC SALTS AND THEIR OFFICIAL PREPARATIONS

PROFESSOR WULLING

Three credits (fifty-four hours lecture)

Third and fourth quarters, first year

Prerequisites, pharmacy 10.

Especial reference to description, properties and manufacture.

12. CLASSIFICATION OF PHARMACEUTICAL ORGANIC COMPOUNDS

PROFESSOR WULLING

One credit (eighteen hours lecture)

Third quarter, first year.

A preparation for pharmacy 13.

13. CHEMISTRY OF THE PHARMACOPOEIAL ORGANIC COMPOUNDS AND THEIR PREPARATIONS PROFESSOR WULLING

Three credits (fifty-four hours lecture) First second and third quarters, second year.

Prerequisite, pharmacy 12.

This course includes the critical study of cellulin and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes, and animal fats, alkaloids, glucosides, animal drugs and products, etc.

14. PHARMACOPOEIAL TESTING PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT

Five credits (thirty-six hours lecture, one hundred eight hours laboratory)

First quarter, second year

A critical study of the identity, purity, limit and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound.

15. QUANTITATIVE ANALYSIS OF U. S. P. SALTS AND PREPARATIONS

PROFESSOR WULLING AND MR. BACHMAN

Two credits (eighteen hours lecture, thirty-six hours laboratory)

Fourth quarter, second year.

Prerequisites, chemistry 3 and pharmacy 14.

This course includes the gravimetric, volumetric and gasometric determinations of the U. S. Pharmacopoeia, but not pharmaceutical assay work (20).

16. INCOMPATIBILITY PROFESSOR WULLING AND MR. BACHMAN

One-half credit (nine hours lecture) Second and third quarter, second year

Therapeutic, pharmaceutical and chemical incompatibility is taken up in lecture and recitation work preliminary to 17.

17. DISPENSING PROFESSOR WULLING AND MR. BACHMAN

Five and one-half credits (twenty-seven hours lecture, on hundred forty-four hours laboratory) Third and fourth quarter, second year

Prerequisite, pharmacy 16.

The study of the prescription and practical work in dispensing upwards of one hundred typical prescriptions.

18. MANUFACTURE OF OFFICIAL ORGANIC AND INORGANIC SALTS AND PREPARATIONS PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT

Four and one-third credits (twenty-four hours lecture, one hundred eight hours laboratory) Second quarter, second year

The preparation of about forty official salts included in the course.

19. NATIONAL FORMULARY PROFESSOR WULLING AND MR. BACHMAN

One credit (six hours lecture, twenty-four hours laboratory)

Third quarter, second year

This course includes the study of the National Formulary and the making of one or more members of each class of preparations.

2. PHARMACEUTICAL ASSAY PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT

One and one-third credits (six hours lecture, thirty-six hours laboratory)

Fourth quarter, second year

Prerequisites, pharmacy 14 and chemistry 3.

The quantitative determination of active constituents of a number of the potent organic drugs and preparations.

21. **SYNTHETIC REMEDIES** PROFESSOR WULLING
 One-third credit (six hours lecture) Fourth quarter, second year.
 Prerequisites, pharmacy 12 and 13 and chemistry 4.
 A study of the chemistry of synthetic remedies in medical use.
22. **HOMEOPATHIC PHARMACY** PROFESSOR WULLING AND MR. BACHMAN
 Fourth quarter, second year.
 A brief exposition of the principles underlying homeopathic medication with some laboratory work.
23. **IDENTIFICATION OF SALTS** MR. BACHMAN
 One and one-half credits (fifty four hours laboratory)
Second semester, first year and entire second year.
 The study of the physical identity of the more important official inorganic and organic salts.
24. **MICO-CHEMISTRY** PROFESSOR WULLING
 Fourth quarter, second year. (Optional)
 A brief course is provided for seniors if time permits.

PHARMACEUTICAL JURISPRUDENCE

1. **LAW FOR PHARMACISTS** PROFESSOR WULLIN
 Two-thirds credit (twelve hours lecture) Fourth quarter, second year
 The lectures introduce the subjects of contracts, agency, commercial paper, insurance, and discuss the liability of retail and manufacturing pharmacists, etc.

PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY

1. **MINERALOGY** MR. GROUT
 One credit (eighteen hours lecture) First quarter, second year.
 Prerequisite.
 A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relations.
2. **CRYSTALLOGRAPHY** MR. GROUT
 One credit (eighteen hours lecture) Second quarter, second year.
 Prerequisite, mineralogy 1.
 A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks.

PHARMACOGNOSY

..... Professor of Pharmacognosy
 FREDERIC K. BUTTERS, M. S., Instructor in Pharmacognosy
 Assistant

1. **CRUDE VEGETABLE DRUGS** MR. BUTTERS
 Seven credits (fifty-four hours lecture, one hundred forty-four hours laboratory)
First, second and third quarters, second year.
 Prerequisites, Botany 1, 2 and 3.
 The vegetable drugs of the United States Pharmacopœia are taken up in the following order: Roots, rhizomes, tubers and bulbs, woods, barks, leaves, herbs, and flowers, fruits, seeds, plant exudations, resins, gum-resins waxes and starches. Each drug is carefully examined, both macroscopically and microscopically. Students are also provided with specimens for home study. The lectures give, in compact

form, the history and important features of each drug, with consideration of its importance to the pharmacist. The quizzes include careful drill on the constituents, action and dose and official preparation of each drug considered. Identification receives careful attention and there are weekly tests of the student's ability. A short course is given in the microscopic examination of some of the more important alkaloids and glucosides, and of certain emulsions and inorganic salts, if time permits.

The drugs are considered in the following order:

ROOTS. Sarsaparilla (Mexican, Para and Honduras), senega, gentiana, taraxacum, pyrethrum, lappa, stillingia, sumbul, phytolacca, althæa, belladonna, calumba, glycyrrhiza, (Spanish and Russian), ipecacuanha, pareira, krameria.

RHIZOMES. Aspidium, zingiber (Jamaican, East Indian and African), calamus, veratum, cypripedium, convallaria, triticum, sanguinaria, geranium, podophyllum valeriana, serpentaria, spigelia, hydrastis, cimicifuga, leptandra, gelsemium, berberis scopola, rheum, apocynum.

TUBERS AND BULBS. Jalapa, aconitum, colchicum, scilla.

WOODS. Quassia, hæmatoxylon, santalum rubrum,

BARKS. Cinchona (Rubra et Flava), prunus virginiana, hamamelis, vilburnum prunifolium, viburnum opulus, rubus, quercus alba, granatum, frangula, rhamnus purshiana, xanthoxylum, mezereum, gossypium, euonymus, quillaja, ulmus, sassafras, cinnamomum (Ceylon, Saigon and cassia).

LEAVES AND LEAFLETS. Pilocarpus, eucalyptus, uva ursi, senna (Alexandria and India), coca (Bolivian and Truxilla), belladonna, stramonium, hyoscyamus, digitalis, matico, salvia, hamamelis, eriodictyon, chimaphila, buchu (long and short).

HERBS AND FLOWERS. Santonica, caryophyllus, calendula, cusco, arnica, matricaria, anthemis, rosa gallica, zea, chondrus, cannabis indica, scoparious, eupatorium, grindelia, lobelia, mentha piperita, mentha viridis, hedeoma, marrubium, scutellaria, chirata, sabina.

FRUITS. Humulus, piper (longum, nigrum et album), cubeba, pimenta, rhus glabra, capsicum, colocynthis, cassia fistula, cardamomum, vanilla, coriandrum, conium, anisum, carum, feniculum, (Roman and German), aurantii amari cortex, aurantii dulcis cortex, limonis cortex et succus, prunum, tamarindus (East and West Indian), ficus, sabal.

SEEDS. Physostigma, amygdala (dulcis et amara), pepo, myristica, sinapis (alba et nigra), nux vomica, staphisagria, ricinus, tigium,

MISCELLANEOUS. Guarana, lactucarium, alœ (Socotrina, Barbadosensis, et Capensis), kino (Malabar et Pallas), gambir, opium, elastica, manna, saccharum, acacia, tragacantha, mastiche, guaiacum, benzoinum, cambogia, asafoetida, scammonium, myrrha, copaiba, terebinthina, terebinthina canadensis, resina, pix liquida, styrax, balsamum peruvianum tolutanum, camphora, thymol, menthol, ergota (Spanish and German), sassafras medulla, galla (Aleppo et Chinensis), gossypium, purification, lupulinum, lycopodium, amyllum, maltum.

Besides the foregoing, a number of the more important unofficial drugs and the animal drugs will also be discussed.

2. POWDERED DRUGS

MR. BUTTERS AND ASSISTANT

One credit (nine hours lecture, twenty-seven hours laboratory)

Fourth quarter, second year.

Prerequisite, pharmacognosy 1.

This course consists of laboratory work and occasional lectures. The more important vegetable drugs are examined microscopically in powdered form. Especial attention is paid to the identification of unknown powders, and to the detection of the various forms of sophistication to which powdered drugs are subject.

PHYSIOLOGY

RICHARD O. BEARD, M.D., Professor of Physiology

M. R. WILCOX, M.D., Professor of Physiology

JULIUS PARKER SEDGWICK, B.S., M.D., Instructor in Physiological Chemistry

1. PHYSIOLOGY, ANATOMY AND HISTOLOGY PROFESSORS BEARD AND WILCOX

One credit (eighteen hours lecture and recitation) First quarter, second year

1. The work covers the study of the physiological properties of the cell, the nutritive media, the nervous mechanisms in general, muscular tissues, connective tissues and epithelial tissues. The subjects of anatomy and histology are touched upon sufficiently to lay the foundation for the proper understanding of physiological functions.

Special attention is directed to the action of drugs and their effects upon the various systems.

2. QUALITATIVE AND QUANTITATIVE URANALYSIS (Post-Graduate)

PROFESSOR BEARD AND DR. SEDGWICK

One credit (nine hours lecture, eighteen hours laboratory)

Second semester

Prerequisite, Physiology 1.

Lectures, recitations and laboratory work. The laboratory work includes the qualitative analysis of representative specimens of urine as regards their physical properties, inorganic and organic constituents, as well as the quantitative determination of chlorides, urea, ammonia, total nitrogen, sugar and albumin, together with the preparation of reagents.

3. EXPERIMENTAL PHYSIOLOGY (Post-Graduate) PROFESSORS BEARD AND WILCOX

Four credits (thirty-six hours lecture, seventy-two hours laboratory)

Second semester

Prerequisite, physiology 2.

Laboratory work and demonstrations. A study of physiologic apparatus, electric stimuli and methods of experimentation; the demonstration and performance of experiments which illustrate physiologic function in the muscular, nervous, vascular respiratory and glandular systems; and the study of the cardiac areas, the heart and respiratory sounds, and of pulse tracings including training in the use of sphygmograph the stethoscope, phonendoscope, etc.

4. PHYSIOLOGICAL CHEMISTRY AND MICROSCOPY (Post-Graduate)

PROFESSORS BEARD AND WILCOX AND DR. SEDGWICK

Eight credits (seventy-two hours lecture, one hundred forty-four hours laboratory)

First semester

Prerequisite, physiology 3.

Laboratory work and demonstrations. A practical study of the several classes of proteids; of carbohydrates, fats, muscle and bone; of gastric juice, saliva, pancreatic juice and bile in their respective digestions; of glycogen, and of blood lymph, chyle and milk. Microscopic study of the carbohydrates in vegetable and animal forms; of the physiologic emulsions of fat; of the crystalline waste, products, and of the physiologic conditions of the blood cells and of blood crystals. Practical instruction is given during this course in the enumerations of the blood cells, in the estimation of haemoglobin and of the corpuscles in mass, in the spectroscopic examination of the blood in the determination of blood tests, and in the use of polariscope.

MINNESOTA PHARMACY LAW

Several lectures elucidating the rights, duties, privileges and liabilities of pharmacists under the state law regulating the practice of pharmacy, are given by special lectures near the close of the second year.

SPECIAL LECTURES

From twelve to fifteen special lectures on subjects related to the practice of pharmacy are delivered by well-known pharmacists of the state at intervals during the college year.

LECTURE AND LABORATORY SCHEDULES

The work of the regular course for 1908-'09 will be somewhat augmented, but the herewith schedule of the past year will be adhered to as far as possible. The necessary changes will be posted on the college bulletin in September.

The college year is divided into four quarters, the first and second constituting the first semester, and the third and fourth the second semester. The college year covers nine full months or thirty-eight weeks. Each quarter consists of nine working weeks.

First Semester--Junior and Senior Schedule

FIRST QUARTER										SECOND QUARTER									
1909	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30			
Mon.		Botany Laboratory		Pharmaceutical Chemistry		General Chemistry				Pharmaceutical Laboratory				Qualitative Chemistry					
Tues.	Botany Lecture	Pharm. Chem.				General Chemistry				Botany Laboratory		Pharm. Chem.		Qualitative Chemistry					
Wed.		Botany Laboratory		Pharmaceutical Chem.		Chem. Recitation				Pharmaceutical Laboratory				Qualitative Chemistry					
Thurs.	Botany Lecture	Pharm. Chem.				General Chemistry				Botany Laboratory		Pharm. Chem.		Qualitative Chemistry					
Fri.		Botany Laboratory		Pharmaceutical Chem.		General Chemistry				Pharmaceutical Laboratory				Qualitative Chemistry					
Sat.		Make up Laboratory								Make up Laboratory									
Mon.	Materia Medica	U. S. P. Testing				Dispensing			Materia Medica	Pharmacognosy Laboratory				Pharmaceutical Laboratory					
Tues.		U. S. P. Testing		Physiology		Dispensing				Pharmaceutical Laboratory				Mineralogy and crystallography					
Wed.	Materia Medica	Organic Pharm.	Identification	Pharmacognosy Lecture		Dispensing			Materia Medica	Organic Pharm.	Identification	Pharmacognosy Lecture		Mineralogy and Crystallography					
Thurs.		U. S. P. Testing				Dispensing				Pharmaceutical Laboratory				Pharmaceutical Laboratory					
Fri.	Materia Medica	U. S. P. Testing		Physiology		Dispensing			Materia Medica	Pharmacognosy Laboratory				Pharmaceutical Laboratory					
Sat.		Make up Laboratory								Make up Laboratory									

JUNIOR

SENIOR

Second Semester--Junior and Senior Schedule

THIRD QUARTER

FOURTH QUARTER

	1916	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30	8:30	9:30	11:30	11:30	1:30	2:30	3:30	4:30
Mon.	Materia Medica	Botany Laboratory	Organic Chemistry	Materia Medica	Pharmacognosy Laboratory	Organic Chemistry											
Tues.	Pharm. Chem.	Pharmaceutical Laboratory	Organic Chemistry	Pharm. Chemistry	Pharmaceutical Laboratory	Organic Chemistry											
Wed.	Materia Medica	Pharm. Botany Lecture	Pharm. Chem.	Organic Chemistry	Materia Medica	Pharmacognosy Laboratory	Organic Chemistry										
Thur.	Pharm. Chem.	Pharmaceutical Laboratory	Organic Chemistry	Pharm. Chem.	Pharmaceutical Laboratory	Organic Chemistry											
Fri.	Materia Medica	Botany Laboratory	Organic Chemistry	Materia Medica	Pharmacognosy Laboratory	Organic Chemistry											
Sat.		Make up Laboratory															
Mon.		Quantitative Chemistry	Pharmaceutical Laboratory	First Aids	Law	Pharmaceutical Laboratory											
Tues.		Pharmacognosy Laboratory	Organic Pharm.	Organic Pharmacy	New Remedies	Pharmaceutical Laboratory											
Wed.		Quantitative Chemistry	Pharmaceutical Laboratory	Pharmacognosy Laboratory	Identification	Pharmaceutical Laboratory											
Thurs.		Pharmacognosy Laboratory	Organic Pharm.	First Aids	Law	Pharmaceutical Laboratory											
Fri.		Quantitative Chemistry	Pharmaceutical Laboratory	Pharmacognosy Laboratory	Identification	Pharmaceutical Laboratory											
Sat.		Make up Laboratory															

SENIOR

Students

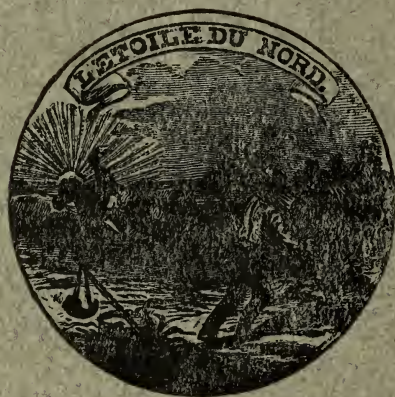
SENIOR PHARMACISTS 1908-9.

- Austin, Alberta J. Millbank, S. D.
 Becker, Frank A. Olivia, Minn.
 Budde, Emil M., 502 Bryant Av. N.,
 Minneapolis.
 Bugbee, Guy C., Paynesville, Minn.
 —Carlson, Helma, Erskine, Minn.
 Carlson, A. E., Willmar, Minn.
 Casey, J. Ambrose, Aitkin, Minn.
 —Caton, Charlotte E., 2441 Bloomington Ave., Minneapolis.
 Cleveland, Zina, Northfield, Minn.
 Colby, Hans C., Jackson, Minn.
 Diessner, Chas. O., Waconia, Minn.
 Doty, Archie C., Eyota, Minn.
 Earle, Fred W., Rochester, Minn.
 Errickson, Wm. A., Cashton, Wis.
 Fratzke, Theodore, Eyota, Minn.
 —Gjerdingen, Nathalia L., Halstad,
 Minn.
 Green, Everard L., Hankinson, N. D.
 Hamilton, Horace L., St. Louis Park,
 Minn.
 Hawlish, Jos. E., Hopkins, Minn.
 —Heath, M. Grace, Riga, N. D.
 Hohn, Walter G., Buffalo, Minn.
 Hooper, Archie J., Minneapolis.
 Hotveldt, Elmer L., Eau Claire, Wis.
 Kelly, John V., 237 St. Albans, St. Paul
 Kleinhuizen, Albert E., Raymond, Minn.
 Klovstadt, Thomas, Milan, Minn.
 Kusterman, Fred G., St. Cloud, Minn.
 Leikvold, Albert I., Waterville, Iowa.
 —Lyman, Emily L., Graceville, Minn.
 —Maxwell, Hazel, 561 Oakland Ave.
 St. Paul
 McMiller, Paul R., Carrington, N. D.
 Munro, Will R., Cummings, N. D.
 Nesse, Ella H., Mabel, Minn.
 Orr, Merton J., Bismarck, N. D.
 Parker, Claude H., 408 2nd Ave., S. E.,
 Minneapolis.
 Paulson, Carl A., 3602 Central Ave.,
 Minneapolis, Minn.
 Peterson, Hugo, O., 1921 9th Avt. South,
 Minneapolis.
 —Peyton, Agnes, Wheaton, Minn.
 Reiersen, Carl R., Spring Grove, Minn.
 Root, Nelson W., Elysian, Minn.
 Schreiter, Norman C., Red Lake Falls,
 Minn.
 Sievert, Arthur F., New Richland, Minn.
 Speidel, Harry W., Ladysmith, Wis.
 Spellman, Clyde A., Montevideo, Minn.
 Tyrholm, Harold A., New Richland, Minn.
 Van Campen, Harry A., Cannon Falls,
 Minn.
 Welch, Leo S., Glencoe, Minn.
 Wolf, George E., Olivia, Minn.
 Yamagishi, Kozo, Kobe, Japan.
 Zender, Chas. H., Henry, S. D.

JUNIOR PHARMACISTS 1908-9

- Adams, Edward M., Wayzata, Minn.
 Ash, Benedict S., Delano, Minn.
 Bersing, Delbert E., Blair, Wis.
 Butterfield, Frederick R., Industry, Ill.
 Carman, J. A., Detroit, Minn.
 Courtney, John F., Glenwood, Minn.
 Doeltz, Otto Paul, 3335 Columbus Ave.
 Minneapolis.
 Doerr, Harry, 327 Oak Grove, Minneapolis
 Ebeltsoft, William H., Lake Park, Minn.
 Emmans, Floyd, Minneapolis.
 Errickson, Carl A., Cashton, Wis.
 —Meadowcroft, Grace, Ruso, N. D.
 Minsky, Alfred, 427 Lyndale Ave., North,
 Minneapolis.
 Monson, Martin J., Delhi, Minn.
 Noer, Victor R., Colfax, Wis.
 Nordstrom, Burt A., Sacred Heart, Minn.
 Olverson, Oscar A., Clark, S. D.
 Paine, S. S., Lake City, Minn.
 Peters, William M., 1016 13th Ave., South
 Minneapolis.
 Parker, Claude H., 408 2d Ave., S. E.
 Minneapolis.

- Hanson, Harry Rochester, Minn.
Harding, Chester E., Delta, Colorado.
Hare, Joseph, Jr., Bismarck, N. D.
Haynes, Manley H., 703 River Road E., Minneapolis.
Henton, Jay C., Morton, Minn.
Homerberg, Victor, Hopkins, Minn.
Hoppe, William F., Breckenridge, Minn.
Hughes, Stuart, 1369 Spruce Place, Minneapolis.
James, Chas. W., Rochester, Minn.
Janecky, Geo. A.; Hutchinson, Minn.
Jepson, Paul, Nashua, Iowa.
Johnson, Theodore, Parker's Prairie, Minn.
Kellam, A. B., Heron Lake, Minn.
Kelly, Chas. F., Webster, S. D.
Lundberg, Wm. W., Brownton, Minn.
Marsh, Edward M., Pine Island, Minn.
—Mathewson, Vera M., 3617 Blaisdell Ave., Minneapolis.
Paulson, Carl M., 2602 Central Ave., Minneapolis.
—Ponthan, Marie W., St. Paul.
—Remes, Anastasia M., New Prague, Minn.
Reum, Arthur, Minneapolis.
—Skartum, Juanita M., Lake Benton, Minn.
Slawson, Frank W., 511 15th Ave., S.E., Minneapolis.
—Snyder, Bessie E., Hector, Minn.
Souba, Emil Geo., Hopkins, Minn.
Spengler, W. A., 734 Ottawa Av., St. Paul.
Spiegel, Louis, 1523 East 19th St., Minneapolis.
Steiner, F. A., Mankato.
Titus, James L., Berea, Kentucky.
Whittemore, Andrew A., Detroit, Minn.
Yamagishi, Kozo, Kobe, Japan.



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The
University of Minnesota
Bulletin

College of Pharmacy

1910-1911



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April 1910

No. 3

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THE REGISTRAR,

The University of Minnesota,

Minneapolis, Minnesota.

CALENDAR FOR 1910-1911

1910

1911

JULY

S.	M.	T.	W.	T.	F.	S.
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3	4	5	6	7	8	9
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AUGUST

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SEPTEMBER

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OCTOBER

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JANUARY

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FEBRUARY

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MARCH

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APRIL

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MAY

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JUNE

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University Calendar

1910-1911

THE UNIVERSITY YEAR

The University year covers a period of thirty-eight weeks beginning on the second Tuesday in September. Commencement day is always the second Thursday in June.

1910

August	30	Tuesday	Registration closes except for new students
Aug. 30-Sept. 6	Week		Fees payable, except for new students.
September 6	12	Week	Entrance examinations, condition examinations, freshman registration and payment of fees.
September	13	Tuesday	First semester begins.
September	26	Monday	University Council meeting.
October	3	Monday	School of Agriculture session begins
October	6	Thursday	Board of Regents meeting
November	10	Thursday	Second quarter begins
November	24	Thursday	Thanksgiving Day, recess three days
November	28	Monday	University Council meeting
December	13	Tuesday	Board of Regents meeting
December	16	Friday	Holiday recess begins 5:40 P. M.

1911

January	3	Tuesday	Holiday recess ends 8:30 A. M.
January	17	Tuesday	Registration for second semester closes
January	24	Tuesday	Payment of fees for second semester closes
January	31	Tuesday	Second semester begins
February	22	Wednesday	Washington's birthday, holiday
March	22	Wednesday	School of Agriculture session closes
April	6	Thursday	Fourth quarter begins
April	8	Saturday	Easter recess begins 5:40 P. M.
April	17	Monday	Easter recess ends 8:30 A. M.
April	24	Monday	University Council meeting
May	4	Thursday	Board of Regents meeting
May	30	Tuesday	Decoration Day, holiday
June	3	Saturday	Second semester closes
June	4	Sunday	Baccalaureate service
June	5	Monday	Senior class day exercises
June	6	Tuesday	Sigma Xi address
June	6	Tuesday	Senior promenade

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June	7	Wednesday	Alumni Day
June	7	Wednesday	Board of Regents meeting
June	8	Thursday	Thirty-ninth Annual Commencement
June	9	Friday	Summer vacation begins

PROGRAM—ENTRANCE EXAMINATIONS

1910-11

Entrance examinations for admission to the various colleges of the University will be conducted according to the following schedule, in Room 205, Library Building.

Any student finding a conflict in his program should report to the Registrar for adjustment.

September	6	Tuesday	9 A. M.	Astronomy Botany Geology Chemistry Physiography Zoology
			2 P. M.	American Government History Economics Physics Commercial Geography
September	7	Wednesday	9 A. M.	English
			2 P. M.	German French Latin Scandinavian
September	8	Thursday	9 A. M.	Elementary Algebra
			2 P. M.	Higher Algebra
September	9	Friday	9 A. M.	Plane Geometry
			2 P. M.	Solid Geometry

Examinations for advanced standing and to remove conditions will be held during September 6-10. Schedule of same will be posted on the bulletin board.

Students must register for examinations in dean's office at least twenty-four hours prior to any examination they may wish to take. See also under Rules for regulation concerning unremoved conditions, etc.

Conditioned students will not be admitted to any examination without presenting receipt from the cashier for the examination fee, to the dean and obtaining entrance ticket.

The University Year for 1911-12 will begin Tuesday, September 12.

The University

THE UNIVERSITY OF MINNESOTA comprises the following named schools colleges and departments:

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE DEPARTMENT OF AGRICULTURE, including—

THE COLLEGE OF AGRICULTURE

THE SCHOOL OF AGRICULTURE

THE DAIRY SCHOOL

THE SHORT COURSE FOR FARMERS

THE SHORT COURSE FOR TEACHERS

THE SCHOOL OF TRACTION ENGINEERING

THE FORESTRY SCHOOL

THE CROOKSTON SCHOOL OF AGRICULTURE

THE COLLEGE OF LAW

THE COLLEGE OF MEDICINE AND SURGERY, including—

THE TRAINING SCHOOL FOR NURSES

THE COLLEGE OF DENTISTRY

THE COLLEGE OF PHARMACY

THE SCHOOL OF MINES

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF EDUCATION

THE GRADUATE SCHOOL

The Regents of the University have entrusted to their charge:

THE EXPERIMENT STATIONS, including—

THE MAIN STATION AT ST. ANTHONY PARK

THE SUB-STATION AT CROOKSTON

THE SUB-STATION AT GRAND RAPIDS

THE GEOLOGICAL AND NATURAL HISTORY SURVEY

Bulletins of these schools, colleges and departments may be obtained upon application to the University Registrar.

The Board of Regents

CYRUS NORTHROP, LL.D., MINNEAPOLIS	<i>Ex-Officio</i>
The President of the University	
The HON. JOHN LIND, MINNEAPOLIS	1914
The President of the Board	
The HON. ADOLPH O. EBERHART, MANKATO	<i>Ex-Officio</i>
The Governor of the State	
The HON. C. G. SCHULZ, ST. PAUL	<i>Ex-Officio</i>
The State Superintendent of Public Instruction	
The HON. THOMAS WILSON, ST. PAUL	1915
The HON. A. E. RICE, WILLMAR	1915
The HON. B. F. NELSON, MINNEAPOLIS	1916
The HON. PIERCE BUTLER, ST. PAUL	1916
The HON. CHARLES A. SMITH, MINNEAPOLIS	1916
The HON. MILTON M. WILLIAMS, LITTLE FALLS	1913
The HON. W. J. MAYO, ROCHESTER	1913
The HON. HENRY B. HOVLAND, DULUTH	1914

C. D. DECKER, MINNEAPOLIS,
Secretary of the Board.

Executive Officers

THE UNIVERSITY

CYRUS NORTHROP, LL.D., PRESIDENT

ERNEST B. PIERCE, B. A., REGISTRAR

JAMES T. GEROULD, B. A., LIBRARIAN

C. D. DECKER, PURCHASING AGENT

J. D. BREN, CASHIER

THE COLLEGES

JOHN F. DOWNEY, M.A., C.E., DEAN OF THE COLLEGE OF SCIENCE,
LITERATURE AND THE ARTS

FRANCIS C. SHENEHON, C.E., DEAN OF THE COLLEGE OF ENGINEERING
AND THE MECHANIC ARTS

ALBERT F. WOODS, M.A., DEAN AND DIRECTOR OF THE DEPARTMENT
OF AGRICULTURE

WILLIAM S. PATTEE, LL.D., DEAN OF THE COLLEGE OF LAW

FRANK FAIRCHILD WESBROOK, M.A., M.D., C.M., DEAN OF THE
COLLEGE OF MEDICINE AND SURGERY

ALFRED OWRE, D.M.D., M.D., DEAN OF THE COLLEGE OF DENTISTRY

FREDERICK J. WULLING, Phm.D., LL.M., DEAN OF THE COLLEGE OF
PHARMACY

WILLIAM R. APPLEBY, M.A., DEAN OF THE SCHOOL OF MINES

GEORGE B. FRANKFORTER, M.A., Ph.D., DEAN OF THE SCHOOL OF
CHEMISTRY

GEORGE F. JAMES, Ph.D., DEAN OF THE COLLEGE OF EDUCATION

HENRY T. EDDY, C.E., Ph.D., LL.D., DEAN OF THE GRADUATE SCHOOL

ADA L. COMSTOCK, DEAN OF WOMEN

The University Council

At the regular meeting of the Board of Regents of the University, May 31st, 1905, a University Council was established according to the following plan:

I. The name of the body shall be the University Council. It shall consist of the President of the University, the Deans of the various colleges and schools, one elected representative from each college or school for each 400 students or major fraction thereof, and one representative of the general alumni association.

II. The elected members shall serve for a period of one year. They shall be chosen from the various faculties at the time of the selection of standing committees. The representative of the general alumni association shall be chosen by that body at its annual meeting from among the alumni who are not members of the University.

III. The Council shall be authorized to—

a) Appoint the following committees or the faculty representation thereon:

The University auditing committee

The University press committee

The committee on athletics

The committee on University relations to other institutions of higher learning.

The committee on health and sanitation

The committee on commencement and other University functions

The committee on catalogue, programs and courses of study

The committee on student entertainments and social affairs

And such other committees as the general University interests may require.

b) Receive reports from such committees and to make such recommendations as may be required.

c) Consider and act upon any matter of general University interest beyond the province of a single faculty which may be referred to it by the President of the University or any faculty.

IV. The Council shall hold stated meetings upon the first Monday of October, December, April and June, and such other meetings as the President of the University may call.

Representatives to the Council

The University

PRESIDENT CYRUS NORTHROP

The College of Science, Literature and the Arts

DEAN JOHN F. DOWNEY

PROFESSOR H. F. NACHTRIEB

PROFESSOR J. C. HUTCHINSON

PROFESSOR CARL SCHLENKER

PROFESSOR NORMAN WILDE

The College of Engineering and the Mechanic Arts

DEAN FRANCIS C. SHENEHON

PROFESSOR GEORGE D. SHEPARDSON

The College and School of Agriculture

DEAN ALBERT F. WOODS

PROFESSOR JOHN T. STEWART

PROFESSOR EDWARD M. FREEMAN

The College of Law

DEAN WILLIAM S. PATTEE

PROFESSOR HENRY J. FLETCHER

The College of Medicine and Surgery

DEAN F. F. WESBROOK

PROFESSOR THOMAS G. LEE

The College of Dentistry

DEAN ALFRED OWRE

The College of Pharmacy

DEAN FREDERICK JOHN WULLING

The School of Mines

DEAN WILLIAM R. APPLEBY

The School of Chemistry

DEAN GEORGE B. FRANKFORTER

The College of Education

DEAN GEORGE F. JAMES

The Graduate School

DEAN HENRY T. EDDY

The Dean of Women

ADA L. COMSTOCK

The University Library

JAMES T. GEROULD

General Alumni Association

DAVID P. JONES

University Council Committees

The University Auditing Committee

PROFESSORS SIGERFOOS, FLETCHER, MITCHELL, SPRINGER
WASHBURN

The Committee on Athletics

PROFESSORS PAIGE, HARDING, D. P. JONES, LITZENBERG,
ROBINSON

The Committee on Grounds and Sanitation

PROFESSORS WESBROOK, APPLEBY, BASS, BRACKEN, FLATHER,
FRANKFORTER, WOODS

The Press Committee

PROFESSORS SCHAPER, BEACH, CONSTANT, JOHNSTON, THOMAS

The Committee on Commencement and other University Functions

PROFESSORS NACHTRIEB, BUTTS, JAMES, KIRCHNER, PATTEE,
SCHLENKER, DR. SCOTT, WILDE

The Committee on Student Entertainments and Social Affairs

PROFESSORS PIKE, BASS, BAUER, CLEMENTS, COMSTOCK, COOKE,
OWRE

The Committee on University Relations to other Institutions of Higher Learning

PROFESSORS DOWNEY, BOTHNE, EDDY, GREEN, JAMES. LEE,
SHENEHON

The Committee on University Extension and University Lectures

PROFESSORS JAMES, GRAY, HAECKER, A. E. HAYNES, JENKS, LEE,
WULLING

The Committee on the Library

PROFESSORS EDDY, FLETCHER, GEROULD, LEE, REYNOLDS,
SHENEHON, VAN BARNEVELD, WEST, JOHN ZELENY

The College of Pharmacy

FACULTY

FREDERICK J. WULLING, Phm.D., LL.M., etc., Dean Professor of Pharmacology.

RICHARD O. BEARD, M.D., Professor of Physiology.

CHAS. F. SIDENER, B. S., Professor of Quantitative Chemistry.

GEORGE B. FRANKFORTER, M.A., Ph.D., Professor of Chemistry.

FRANK F. WESBROOK, M.A., M.D., C.M., Professor of Bacteriology.

EVERHART P. HARDING, M. S., Ph. D., Assistant Professor of Chemistry.

M. R. WILCOX, M. D., Assistant Professor of Physiology.

HIBBERT W. HILL, Assistant Professor of Bacteriology

IRA HARRIS DERBY, B. S., Assistant Professor of Chemistry.

FREDERIC E. CLEMENTS, Ph.D., Professor of Botany.

E. D. BROWN, Pharm. D., M. D., Professor of Materia Medica and Therapeutics.

..... Professor of Pharmacognosy

INSTRUCTORS AND ASSISTANTS

GUSTAV BACHMAN, Phm.D., Phm.M., Instructor in Pharmacy.

OSCAR BLOSMO, Ph. C., Assistant in Pharmacy.

FREDERICK K. BUTTERS, M. S., Instructor in Microscopy and Pharmacognosy.

EDWARD FIDLAR, B.A., M.B., Demonstrator in Bacteriology

FRANK F. GROUT, B. S., Instructor in Mineralogy.

JOHN A. HANDY, Ph. C., Instructor in Chemistry.

GEORGE D. HEAD, B. S., M. D., Instructor in Clinical Microscopy.

JOHN ELDON HYNES, Ph.C., Assistant in Clinical Microscopy.

C. A. HARDING, Phm.B., Pharmacy Laboratory Assistant.

T. R. MARTIN, M.D., Instructor in Bacteriology

C. N. MCCLOUD, Phm. D., M. D., Lecturer on First Aids to the Injured.

J. P. SEDGWICK, B. S., M. D., Instructor in Physiological Chemistry.

W. D. SHELDON, M.D., Instructor in Therapeutics.

..... Instructor in Pharmaceutical Latin.

..... Assistant in Materia Medica.

..... Assistant in Pharmacognosy.

F. H. SCOTT, M.D., Instructor in Physiology

SPECIAL LECTURERS

W. A. FROST

STEWART GAMBLE

J. W. HARRAH

CHARLES H. HUHN

J. N. KIRBY

A. J. KLINE

C. B. MCCALL

HENRY MCCOLL

A. D. THOMPSON

E. A. TUPPER

THOMAS VOEGELI

ADMISSION

A—TO THE TWO-YEAR COURSE

While nearly all students enrolled in this college are graduates of full four-year high school courses, such a training prior to entrance is not obligatory at the present time. The requirements, however, are being raised gradually in such a way that soon they shall be a full high school preparation or an equivalent for all matriculants.

I. Applicants may be admitted without examination if they bring certificates of graduation from, or standing in, institutions of the collegiate grade or present other credentials showing that they have successfully completed the branches of study embraced in a full four-year high school course, or an equivalent, provided that among the branches completed are:

English, two years, including the principles of composition and practice in written expression.

Algebra, one year, elementary, up to beginning of higher algebra.

Geometry, one year, elementary.

Physics, one year, elementary.

Latin, two years: grammar, one year; Caesar (four books), one year.

II. Other applicants must pass examinations in the branches above specified, i. e., in English, algebra, geometry, physics and Latin, or present satisfactory evidence of having completed these branches, for which substitutes cannot be accepted.

Students will be allowed to carry not more than two conditions which, however, must be removed before the final examinations in the first year subjects.

In certain cases credit is given for drug store experience.

B—TO THE THREE-YEAR COURSE

The minimum requirements for admission to the three-year course are the same as those for admission to the two-year course II., with the exception that students may carry as conditions not more than three of the entrance subjects among which English cannot be. Students must pursue the branches in which they are conditioned during their first year and pass examinations in them or present evidence of having satisfactorily completed the branches. The subjects are not taught at the college but may be taken at the academy near by, or at the city high schools or with private tutors. The University Y. M. C. A. usually establishes courses for the benefit of students conditioned in entrance branches.

Applicants whose preparatory course of study has not conformed precisely to the requirements above enumerated will be allowed to offer, in lieu of a portion of these requirements, equivalent preparation in similar branches of study; and if they show, by examination, or by other

evidence, that their preparation has been substantially equivalent, such branches will be accepted as substitutes for those omitted.

The examinations for entrance are conducted by the faculty of the College of Pharmacy, in the pharmacognosy rooms, beginning at 9:00 a.m., on Tuesday, September 13, 1910. Lecture work begins as soon as possible after the examinations, usually the following day.

Every applicant is required to furnish a certificate of good moral character.

Those who do not pass the entrance examinations, may enter and complete their course in three years, provided they pursue the subjects required for admission, in addition to the professional work that may be assigned to them, and pass their entrance examinations, before the end of the first year.

REGISTRATION

All applicants for admission to the regular courses must present to the Dean not later than September 13, their school or high school certificates, diplomas or such other credentials as they may wish to offer toward meeting in whole or in part the entrance requirements. If these are found satisfactory the applicant will register in the office of the University Registrar, who will issue a card to the University Accountant to whom the applicant will pay the tuition and breakage fees and microscope rental and receive receipts therefor. Registration is completed by depositing these receipts in the office of the Dean. The student is then classified.

ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must pass the examinations of all departments in which they wish to be exempt, if such examinations are deemed necessary by the professors in charge. Students will not be permitted to substitute private work in any branch for the regular course work.

UNCLASSSED STUDENTS

Unclassed or special students may enter at any time providing there is laboratory room for them. They will not be rated on their work nor examined unless they make special request therefor. Work completed will be credited should the student subsequently enter the regular course.

EXAMINATIONS AND STANDINGS

Examinations are held at the end of the regular school year and dur-

ing the last week of the first semester, and are supplementary to the written tests and quizzes that are held at frequent intervals during the year, and with them form largely the basis of final determination of fitness for promotion or graduation. Students are rated throughout the year, and all who have a standing of ninety per cent, or more, in certain of the branches, may not be required to take the final examination in those branches.

Students are not required to write graduating theses, but instead, they keep complete records of all their laboratory work. The records are to be kept in substantially bound books, to be approved by the faculty. The respective professors call for the records for inspection and rating once a month or oftener. Duplicates of records are to be furnished the college by the students. The college provides the paper.

The standing of students is determined by the results of recitations, written examinations, laboratory work and attendance. It is indicated by the terms "excellent," "passed," "conditioned," "incomplete," or "failed." Conditions may be removed as indicated below. Incomplete work must be made up before the final examinations of the following year.

In order to become eligible for final examinations, students are required to attend at least four-fifths of the lectures in each course. This rule is not intended for the benefit of those who seek admission after the opening of the college year, but is designed to cover cases of sickness or unavoidable absence. It does not apply to laboratory courses which must be taken in full and must be entered during the first week in which they begin.

Students having conditions in more than two major or in more than three minor subjects of the first year, cannot enter upon the second year's work. All entrance conditions must be removed before the next spring examination. Candidates for graduation must have removed all conditions before entering upon the second semester of the graduating year.

Condition examinations are held during the first week of the course in September. The dates are usually posted in June. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given.

A fee of one dollar is charged for a second condition examination.

Failure at the second condition obliges the student to repeat the work of the respective course.

Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

Absence will not be excused, unless satisfactory reasons are given to the professor in charge. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may sub-

ject the student to temporary or permanent suspension. Students are earnestly requested to be present at the beginning of the school year, but those who cannot enter in the fall may enter at the beginning of the second semester taking any of the subjects beginning then. Any of the facilities for work in the University are open to the students of this college, subject to the approval of the Dean. Opportunity is afforded to do advanced work in all branches. Text-books may be obtained after coming to the University.

The work of the college, as outlined in the following pages, is conducted by means of lectures, recitations and laboratory exercises. Students find their time fully occupied. Those who feel unable to complete the work in two years may divide it in a manner to complete it in three years. Practicing pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities.

GRADUATION REQUIREMENTS

Regular attendance at lectures, recitations and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven-eighths of the required number of exercises.

Every person upon whom the degree is conferred must be of good moral character, and must be at least twenty-one years old; must have attended two full lecture and laboratory courses, the last at this college, and must have passed a successful examination in the subjects required for graduation.

Drug store experience is not a requirement for graduation.

Those who fail to appear for examination after having paid their diploma fee, or those who do not pass satisfactorily, will be permitted to present themselves at any subsequent examination, upon payment of an additional fee of five dollars, and complying with all other requirements.

DEGREES

The college confers the degrees Bachelor of Pharmacy, Master of Pharmacy and Doctor of Pharmacy for the completion of respectively the regular and the two graduate courses.

FEEES

TWO YEAR REGULAR COURSE

First year tuition.....	\$75.00
Second year tuition.....	90.00
	\$165.00

THREE YEAR REGULAR COURSE

First year tuition.....	\$45.00
Second year tuition.....	55.00
Third year tuition.....	65.00
	\$165.00
Annual deposit covering all laboratories	\$10.00
Annual Microscope rental	2.00
Second condition examination fee, each subject	1.00

FIRST GRADUATE COURSE

Tuition for the entire course.....	\$75.00
Final Examination fee.....	10.00
	\$85.00

There are no other tuition fees. Fees are payable at the time of registration. Those desiring to take special work will be required to pay an average of fifteen dollars a subject for the lecture courses and twenty-five dollars for the laboratory courses.

Students will be charged for laboratory material if used unreasonably. At the end of the laboratory courses students will be required to pay for breakage and damage to utensils in their care. If a student is careful this charge need not amount to more than two or three dollars. Students are to provide themselves with a designated set of metric weights, a set of apothecary's weights and steel spatulas. The expense of these may be kept within three dollars. Students using platinum crucibles are charged for them. Upon the return of the crucible in the original condition the charge is cancelled; if the crucible is in any wise damaged the full value is collected from the student. A rental of two dollars per college year or fraction thereof is collected for use of a microscope. All money is payable to the University Accountant, who will give receipts which must be deposited in the Dean's office.

Fees will not be returned, except in case of discontinuance for sufficient reason before the student has been assigned to a place in the laboratory.

A deposit of ten dollars will be made with the Accountant each year, by every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage to or in the college buildings and of breakage and loss of laboratory apparatus and material. It will be returned to the student at the close of each year, minus the cost of articles assigned to him that he fails to return in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give receipt. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

All apparatus lost or damaged will be charged to him, and must be paid for before he can receive credits for his course, or take his annual examinations.

COLLEGE TRAINING FOR PHARMACISTS

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In New York, Pennsylvania, Hawaii, Wisconsin, Ohio and Louisiana, such training is obligatory either by law or by rule of the boards of pharmacy. In a number of other states credit is given for college work. In Minnesota graduates from recognized colleges need to have only two years of practical experience, while all others must have had four years of drug store experience before they become eligible for examination by the State Board of Pharmacy for full license to practice in Minnesota. Graduates of the three-year course who have gained practical experience concurrently with their college work need only one additional year of drug store experience before they become eligible for examination for full registration.

At the Joint Conference of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties, held at Indianapolis, Ind., in September, 1906, the following resolution was adopted:

"Special education for the practice of pharmacy is in this age a necessity and should as rapidly as possible be made compulsory. The rules of the boards of pharmacy are such as to promote and encourage it in all practicable ways. The special pharmaceutical education should include substantial laboratory courses." The training advocated by these two most representative bodies and by the American Pharmaceutical Association can be obtained only at colleges or schools of pharmacy of recognized standing. It is admitted that the State of Minnesota through its University College of Pharmacy is affording instruction of the most approved kind.

In the organization of this college the Board of Regents and the faculty have had the co-operation of the pharmacists of the state. The character of instruction is of high order and every effort is made to comply with the demands of the profession in the Northwest, or elsewhere, in the maintenance of a course of instruction of the highest grade.

POSITIONS FOR GRADUATES

The demand for graduates of this College has always been greater than the supply and is continually growing. The rule is that practically all of the senior class are engaged before graduation. This college is recognized in all states, including those in which standards of efficiency have been established, and its graduates are everywhere admitted to board examinations.

STATE BOARD OF PHARMACY

The State Board of Pharmacy meets at the college four times each year to examine candidates for registration. For information concerning the Board or State examinations address the Secretary of the Board, 31 West Tenth Street, corner St. Peter Street, St. Paul, Minn.

COLLEGE OF PHARMACY ALUMNI ASSOCIATION

The Alumni Association of the College of Pharmacy meets annually in the college building the day before commencement, at 3 p.m.. Every member of the association is urgently requested to report change of address to the secretary.

THE AMERICAN CONFERENCE OF PHARMACEUTICAL
FACULTIES

The College of Pharmacy of the University of Minnesota is one of the colleges constituting the American Conference of Pharmaceutical Faculties.

COMMUNICATIONS

Address communications to the Dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minn.

PHI DELTA CHI

The Theta chapter of the Phi Delta Chi fraternity was organized at the College of Pharmacy in 1904. Students of the college of high scholarship are eligible to membership.

PRIZES

Nominations for membership in the American Pharmaceutical Association and the first year's dues are offered annually by Dean Wulling and Mr. Bachman to each of the two students earning respectively the highest total average of standings and the highest standing in pharmacy.

THE NORTHWESTERN BRANCH OF THE AMERICAN
PHARMACEUTICAL ASSOCIATION

The Northwestern Branch of the American Pharmaceutical Association, composed of the representative pharmacists of the Northwest, has its headquarters at the College of Pharmacy. About six meetings are held annually. Pharmaceutical students are eligible to membership in the Branch, but are privileged to attend the meetings without becoming members.

Courses of Instruction

Three courses are offered, the regular and two graduate courses.

The complete regular course extends over two years of nine full months each. Students may arrange their work so as to take the course in three years. The nineteenth annual course begins on September 13, 1910, on which day all students in pharmacy should register. The office of the Registrar is open for the purpose of registration as early as September 10th, but students must first report at the Dean's office in the pharmacy building.

In addition to the regular course this college offers two graduate courses, the first continuing through one college year and leading to the degree "Master of Pharmacy," and the second continuing through an additional year or longer, and leading to the degree "Doctor of Pharmacy." The first graduate course, the one leading to the master's degree, is now in operation. The curriculum includes higher pharmaceutical chemistry, pharmaceutical assaying, higher organic chemistry, proximate and ultimate analysis, chemistry of food, water analysis, toxicology, spectroscopic work, therapeutics, clinical microscopy and bacteriology, and a thesis of at least 3,000 words, embodying the results of original work, but this curriculum may be changed by the faculty if occasion or experience require.

The requirements for admission to the first graduate course are a diploma from a Minnesota high school of the first grade, or an equivalent; a diploma from a college of pharmacy whose curriculum, extent and kind of work and length of under-graduate course are equal to those of the under-graduate work of this college; an acquaintance with either German or French sufficient to enable the student to read and understand the scientific literature of those languages. The fees for this course are seventy-five dollars, and an additional fee of ten dollars for final examinations. The rules relating to damage, waste and breakage in laboratories are the same as those applying to the undergraduate course.

The course leading to the doctor's degree will begin as soon as there are sufficient applicants.

PROPOSED NEW COURSES

Beginning as soon as the proposed enlarged quarters of the college permit, two additional courses may be instituted: the one a lower and shorter than the regular course to conform to the minimum requirements of the American Conference of Pharmaceutical Faculties; the other, a higher than the regular course to lead to the degree "Bachelor of Science in Pharmacy," and to include four years of work. The details have not yet been worked out, but it is probable that the former will include about two-thirds of the work of the regular course and will cover two years of at least six months each. Possibly opportunity will be offered to complete the work in twelve consecutive months, but this is doubtful. The entrance requirements will include the first year in high school or equivalent training or whatever the entrance requirements of the conference may be at the time.

The higher course will cover four years of nine months each and will include two years of academic and cultural work. The qualifications for entrance to this course will be the same as those required for entrance to the College of Science, Literature and the Arts. Those presenting evidence of having completed the first two years of a collegiate course may complete the course in two years, providing the collegiate work completed includes certain subjects in the sciences and mathematics. Full announcement regarding these courses will be made duly.

Courses of Instruction

COURSES OF INSTRUCTION COMPRISING THE REGULAR PHARMACY COURSE

The complete regular course extends over two years of nine full months each. Students may arrange their work so as to take the course in three years. The nineteenth annual course begins on September 13, 1910, on which day all students in pharmacy should register. The office of the Registrar is open for the purpose of registration as early as September 8th, but students must first report at the Dean's office in the pharmacy building.

FIRST YEAR

FIRST QUARTER

Botany 1, six hours, Professor Clements, Mr. Butters and Assistant
Pharmacy 9, five hours, Professor Wulling
Pharmacy 1, 2, and 3, six hours, Professor Wulling, Mr. Bachman and
Assistant.
Chemistry 1, fifteen hours, Professor Derby and Mr. Handy

SECOND QUARTER

Botany 1, six hours, Professor Clements, Mr. Butters and Assistant
Pharmacy 10, three hours, Professor Wulling
Pharmacy 1, 2 and 3, six hours, Professor Wulling, Mr. Bachman,
Mr. Blossmo and Assistant
Chemistry 2, fifteen hours, Professor Derby and Mr. Handy

THIRD QUARTER

Botany 2, six hours, Professor Clements, Mr. Butters and Assistant
Pharmacy 11, two hours, Professor Wulling
Pharmacy 4, six hours, Professor Wulling, Mr. Bachman, Mr. Blossmo
and Assistant

Pharmacy 7, one hour, Mr. Bachman
Materia Medica 1, three hours, Professor Brown and Assistant
Chemistry 5, fifteen hours, Professor Frankforter, Assistant Professor
Derby and Mr. Handy

FOURTH QUARTER

Botany 2, six hours, Professor Clements, Mr. Butters and Assistant
Pharmacy 11, two hours, Professor Wulling
Materia Medica 2, three hours, Professor Brown and Assistant
Pharmacy 4, 5 and 6, six hours, Professor Wulling, Mr. Bachman, Mr.
Blosmo and Assistant
Pharmacy 7, two hours, Mr. Bachman
Pharmacy 8, one hour, Mr. Bachman
Chemistry 5, fifteen hours, Professor Frankforter, Assistant Professor
Derby and Mr. Handy

SECOND YEAR

FIRST QUARTER

Pharmacy 12 and 13, two hours, Professor Wulling
Pharmacy 14, sixteen hours, Professor Wulling, Mr. Bachman, Mr. Blosmo
and Assistant
Pharmacognosy 1, eight hours, Mr. Butters and Assistant
Pharmacy 16 and 17, twelve hours, Professor Wulling, Mr. Bachman and
Assistants
Pharmacy 23, one hour, Mr. Bachman

SECOND QUARTER

Pharmacy 13, two hours, Professor Wulling
Mineralogy and Crystallography, four hours, Mr. Grout
Pharmacognosy 1, seven hours, Mr. Butters and Assistant
Pharmacy 18, twenty hours, Professor Wulling, Mr. Bachman, Mr. Blosmo
and Assistant
Pharmacy 23, one hour, Mr. Bachman
Physiology 1, two hours, Professors Beard, Wilcox and Dr. Scott

THIRD QUARTER

Pharmacognosy 1, six hours, Mr. Butters and Assistant
Chemistry 3, nine hours, Professor Sidener and Assistant
Pharmacy 23, one hour, Mr. Bachman

Pharmacy 13, two hours, Professor Wulling
 Pharmacy 19, fifteen hours, Professor Wulling, Mr. Bachman, Mr. Blossmo
 and Assistant

FOURTH QUARTER

Pharmacy 15, five hours, Professor Wulling and Mr. Bachman
 Pharmacy 13, one hour, Professor Wulling
 Pharmacy 23, one hour, Mr. Bachman
 Pharmacognosy 2, eight hours, Mr. Butters
 Pharmacy 20, 21, 22, 24, twelve hours, Professor Wulling, Mr. Bachman,
 Mr. Blossmo and Assistant
 Therapeutics 3, one hour, Professor Brown and Assistant
 Pharmacy Law, one and one-half hour, Professor Wulling
 First Aids, one and one-half hours, Dr. McCloud

THIRD YEAR

Students taking three years to do the work of the regular two-year course will divide the work in an equitable way subject to the approval of the Dean. Students are urged to devote three years to the completion of the course.

BACTERIOLOGY

1. GENERAL BACTERIOLOGY (POST GRADUATE) PROFESSOR WESBROOK
 ASSISTANT PROFESSOR HILL, AND DR. FIDLAR

Twelve lecture and recitation hours, and twelve laboratory hours per week.

Second year, fourth quarter

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of the bacteria will be dealt with. The classification of the various bacterial forms, the methods of isolation and culture and the composition and manufacture of culture media will be studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken.

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, will be thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water will form an important part of the work. Bacterial activities concerned in sewage purification, etc., will receive attention.

BOTANY AND MICROSCOPY

FREDERIC E. CLEMENTS, Ph.D., Professor of Botany
 FREDERIC K. BUTTERS, M. S., Instructor in Pharmaceutical Botany and
 Microscopy

..... Assistant

1, 2 and 3: ten credits (one hundred and eight hours lecture, one hundred forty-four hours laboratory) First year

1. COMPARATIVE MORPHOLOGY OF THE CRYPTOGRAMS PROFESSOR CLEMENTS,
MR. BUTTERS

The course embraces morphology of the cryptogams. Especial attention is paid to the green algae, the foundation of the vegetable kingdom. The other groups of algae and the fungi are briefly treated, particular stress being laid on their economic relations to other plants, to animals and to man. Examples of liverworts, mosses, ferns, and their allies are studied in the laboratory, and the line of development which leads from the algae through the archegoniate series to the seed plants is emphasized.

2. THE MORPHOLOGY, ANATOMY AND CLASSIFICATION OF THE HIGHER SEED PLANTS
PROFESSOR CLEMENTS AND MR. BUTTERS

Prerequisite, botany 1

In this course especial attention is paid to vegetable histology. The characteristic plant tissues are examined, and their arrangement is noted in roots, stems, leaves, fruits and seeds. The formation and occurrence of carbo-hydrates, glucosides, alkaloids, organic acids, resins, gums, gum resins and oleo-resins are carefully studied. Considerable time is devoted to a study of the basis of classification of flowering plants and to the identification of plants in the field.

3. MICRO-BOTANY MR. BUTTERS

Designed to furnish practical training in the use of the microscope, in the preparation of material for microscopic examination, including the use of micro-chemical reagents, and in the representation by drawings of all structures observed.

The work of this course is co-incidental with that of 2 and 3.

These courses occupy the equivalent of six hours a week throughout the junior year. They aim to give a comprehensive and scientific view of the vegetable kingdom, to lay a broad foundation for the study of pharmacognosy. Throughout the course attention is frequently directed in the lectures to the wider relations of plants to one another and to animals, and to the discussion of the plant as a living unit, thus bringing before the class the fundamental problems of plant physiology and ecology.

The successful completion of the work in botany is prerequisite to the study of pharmacognosy.

CHEMISTRY

GEORGE B. FRANKFORTER, M.A., Ph. D., Dean of the School of Chemistry

Professor of Chemistry

CHAS. F. SIDENER, B.S., Professor of Quantitative Chemistry

EVERHART P. HARDING, M.S., Ph.D., Assistant Professor of Chemistry

IRA HARRIS DERBY, B.S., Assistant Professor of Chemistry

JOHN A. HANDY, Ph.C., Instructor in Chemistry

1. GENERAL CHEMISTRY PROFESSOR DERBY AND MR. HANDY

Five credits (forty-five hours lecture, ninety hours laboratory)

First quarter, first year

This course includes a study of the chemical properties of the metallic and non-metallic elements.

2. QUALITATIVE ANALYSIS ASSISTANT PROFESSOR DERBY AND MR. HANDY

Five credits (forty-five hours lecture, ninety hours laboratory)

Second quarter, first year

Prerequisite, chemistry 1

This course covers the common reactions of the metals and acids and their qualitative separation. The ionic theory and the law of mass action are discussed with especial reference to qualitative reactions.

3. QUANTITATIVE ANALYSIS PROFESSOR SIDENER AND ASSISTANT

Three credits (twenty-seven hours lecture, fifty hours laboratory)

Third quarter, second year

Prerequisites, chemistry 1 and 2

A study of the principles of quantitative estimation; gravimetric, volumetric and gasometric.

4. TOXICOLOGY, WATER AND FOOD ANALYSIS (POST GRADUATE)

PROFESSORS FRANKFORTER, DERBY AND HARDING

Three and one-half credits (twenty-seven hours lecture, seventy-two hours laboratory)

Second quarter, second year

The chemistry of the atmosphere, water, soil, etc.; the sanitary examination of air and water.

5. ORGANIC CHEMISTRY PROFESSORS FRANKFORTER, DERBY AND MR. HANDY

Nine and one-half credits (seventy-two hours lecture, one hundred ninety-eight hours laboratory)

Third and fourth quarters, first year

This course includes work in both the aliphatic and aromatic series and the preparation of the more important compounds.

CLINICAL MICROSCOPY

1. CLINICAL MICROSCOPY (POST GRADUATE) DR. GEO. D. HEAD AND DR. HYNES

Instruction includes (a) the microscopical study of urine, its colors, sediments, and finer chemical tests; (b) the microscopical study of urinary sediments, including blood, pus, epithelial cells, casts, etc.; (c) the macroscopical and microscopical study of sputum, including the study of sputa from cases of pneumonia, pulmonary tuberculosis, asthma, chronic bronchitis, etc.

Lectures and laboratory work. Eight hours weekly; last third, second semester, second year.

DISPENSARY PRESCRIPTION PRACTICE

The dispensing department of the University College of Medicine and Surgery Free Dispensary at 1810 Washington Avenue South, Minneapolis, has lately been placed in charge of the College of Pharmacy, Mr. G. Bachman having supervision. The senior students are sectioned into classes of three for the purpose of doing practical prescription work at the dispensary under the direction of Mr. Bachman or Mr. Bloomo. The dispensary practice continues throughout the college year.

FIRST AIDS TO THE INJURED

1. EMERGENCY CASES

DR. McCloud

Two-thirds credit (twelve hours lecture)

Third quarter, second year

A series of lectures designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician.

MATERIA MEDICA AND THERAPEUTICS

E. D. BROWN, Pharm.D., M.D., Acting Professor of Materia Medica and Therapeutics

C. F. DIGHT, M.D., Instructor in Materia Medica

.....Assistant in Materia Medica

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| 1. INORGANIC MATERIA MEDICA | PROFESSOR BROWN AND ASSISTANT |
| 2. ORGANIC MATERIA MEDICA | PROFESSOR BROWN AND ASSISTANT |
| Six credits (one hundred and eight hours lecture and recitation) | |

Third and fourth quarters, first year

The work in inorganic and organic materia medica is based principally on the U. S. P., but unofficial and synthetic drugs are also studied. The course includes the study of the general characteristics of drugs and of physiological action. Pharmacodynamics, including the study of the identity and quality of drugs, shares attention in the course of pharmacognosy.

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| 3. THERAPEUTICS | PROFESSOR BROWN AND DR. DIGHT |
| One credit (eighteen hours lecture and recitation) | |

Third quarter, second year

Prerequisites, materia medica 1 and 2

In this course drugs are studied in groups, as governed by their physiologic action, and the therapeutic features of such groups are described. Remedial measures other than those depending upon drugs, are fully considered.

PHARMACY

FREDERICK J. WULLING, Phm.D., LL.M., etc., Professor of Pharmacology
 GUSTAV BACHMAN, Phm.D., Phm.M., Instructor in Pharmacy
 OSCAR BLOSMO, Ph.C., Assistant in Pharmacy

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| 1. HISTORY OF PHARMACY | PROFESSOR WULLING |
| One-third credit (six hours lecture, | First quarter, first year |
| The history of the U. S. Pharmacopœia through all its revisions. | |
| Dispensatories, text-books, and works of reference. | |

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| 2. METROLOGY | PROFESSOR WULLING, MR. BACHMAN AND MR. BLOSMO |
| Two-thirds credit (twelve hours lecture) | First quarter, first year |
| Weights and measures, including metric system; balances—construction, varieties, methods of weighing; specific gravity in detail; specific volume, alligation, etc. | |

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| 3. THE PHYSICS OF PHARMACY | PROFESSOR WULLING, MR. BACHMAN
AND MR. BLOSMO |
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Three credits (eighteen hours lecture, seventy-two hours laboratory)

Second quarter, first year

Prerequisite, pharmacy 2

Students are required to have had elementary physics before entering. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. Special attention is paid to heat. Specific heat; thermometers—the various scales, testing and comparing thermometers; combustion of solids, liquids and gases in various kinds of furnaces, stoves and burners; application of heat in drying ovens, steam, hot-air and water ovens; drying closets, desiccators, blow-pipes, crucibles; baths for controlling and equalizing heat; evaporation—spontaneous, rapid, slow, in vacuo; ebullition—boiling points, fusion; sublimation, calcination, dehydration, torrefaction, roasting, reduction, oxidation, carbonization, deflagration, ignition, etc.; solution—pharmaceutical, simple, chemical, saturated; circulatory displacement; dialysis—construction of dialyser, osmosis, endosmosis, exosmosis; crystalloids and colloids, etc.

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| 4. PHARMACEUTICAL PROCESSES | PROFESSOR WULLING, MR. BACHMAN AND
ASSISTANT |
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Three and one-half credits (twenty-four hours lecture, seventy-two hours laboratory)

Second and third quarters, first year

Prerequisite, pharmacy 3.

The processes not taken up in 3, constitute the subjects of this course. In part they are; drug grinding and powdering; comminution; contusion; trituration; sifting; elutriation; levigation; lixiviation; filtration—filtering media, filtration of solutions, oils, syrups, rapid filtration, filtration in vacuo, hot filtration, colation: washing—displacement, continuous; decantation—the syphon and its uses; precipitation—methods, vessels, separating, drying, weighing; granulation—granular effervescent salts; desiccation; exsiccation; crystallization—water of crystallization, deliquescence, methods of obtaining crystals, collecting, draining, washing, drying crystals, fractional crystallization; distillation—simple, fractional, destructive; extraction; maceration; expression; percolation—history, theories, percolators, exhaustion, repercolation, continuous percolation, fractional percolation; clarification; decolorization.

5. PHARMACOPOEIAL PREPARATIONS

PROFESSOR WULLING, MR. BACHMAN
AND ASSISTANT

Five credits (thirty hours lecture, one hundred twenty hours laboratory)

Third and fourth quarters, first year

This course includes the study and preparation of official bodies for which the U. S. P. gives formulæ and processes, and includes waters, solutions, syrups, mucilages, spirits, infusions, decoctions, tinctures, fluid extracts, vinegars, wines, liniments, oleates, ointments, cerates, resins, oleo-resins, honeys; glycerites, mixtures, emulsions, elixirs, collodions, pills, capsules, powders, suppositories, bougies, plasters, papers, cachets, etc.

6. MATHEMATICS OF PHARMACY

PROFESSOR WULLING AND MR. BACHMAN

While students are required to have a preparation in arithmetic and algebra before entering, they receive frequent drills at stated hours and as occasion requires or suggests throughout the entire course. Students are required to take a final examination in the subject at the end of the first year, at which examination they must attain a rating of at least eighty per cent.

7. PHARMACY QUIZ

MR. BACHMAN

Three credits (fifty-four hours)

Second, third and fourth quarters
first year

Prerequisites, pharmacy 2, 3, 4 and 5.

A thorough review of the work covered in 2, 3, 4 and 5.

8. IDENTIFICATION OF INORGANIC OFFICIAL PREPARATIONS

MR. BACHMAN

One credit (eighteen hours)

Second and third quarters, first year

The study of the physical properties of official preparations.

9. CHEMICAL PHILOSOPHY

PROFESSOR WULLING

One and one-half credits (twenty-seven hours lecture)

First quarter, first year

Treats of the principles underlying chemistry, and endeavors to elucidate chemical facts and phenomena. The subject is divided into chemical statics, embracing the study of the theories of atoms and molecules, atomic weights, atomic and molecular volume, quantivalence, molecular structure, ions, electric qualities, etc., and chemical dynamics, the study of reactions and their equations, thermics, chemical properties in general, etc.

10. THE PHARMACEUTICAL CHEMISTRY OF THE NON-METALS AND THEIR PREPARATIONS

PROFESSOR WULLING

One and one-half credits (twenty-seven hours lecture)

Second quarter, first year

Prerequisite, pharmacy 9

11. PHARMACOPOEIAL INORGANIC SALTS AND THEIR OFFICIAL PREPARATIONS

PROFESSOR WULLING

Three credits (fifty-four hours lecture)

Third and fourth quarters, first year

Prerequisites, pharmacy 10

Especial reference to description, properties and manufacture.

12. CLASSIFICATION OF PHARMACENTICAL ORGANIC COMPOUNDS
 PROFESSOR WULLING
 One credit (eighteen hours lecture)
 Third quarter, first year
 A preparation for pharmacy 13
13. CHEMISTRY OF THE PHARMACOPOEIAL ORGANIC COMPOUNDS AND THEIR PREPARATIONS
 PROFESSOR WULLING
 Three credits (fifty-four hours lecture)
 First, second and third quarters, second year
 Prerequisite, pharmacy 12
 This course includes the critical study of cellulin and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes, and animal fats, alkaloids, glucosides, animal drugs and products, etc.
14. PHARMACOPOEIAL TESTING
 PROFESSOR WULLING, MR. BACHMAN AND ASSISTANTS
 Five credits (thirty-six hours lecture, one hundred eight hours laboratory)
 First quarter, second year
 A critical study of the identity, purity, limit and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound.
15. QUANTITATIVE ANALYSIS OF U. S. P. SALTS AND PREPARATIONS
 PROFESSOR WULLING AND MR. BACHMAN
 Two credits (eighteen hours lecture, thirty-six hours laboratory)
 Fourth quarter, second year
 Prerequisites, chemistry 3 and pharmacy 14
 This course includes the gravimetric, volumetric and gasometric determinations of the U. S. Pharmacopoeia, but not pharmaceutical assay work (20).
16. INCOMPATIBILITY
 PROFESSOR WULLING AND MR. BACHMAN
 One-half credit (nine hours lecture)
 Second and third quarter, second year
 Therapeutic, pharmaceutical and chemical incompatibility is taken up in lecture and recitation work preliminary to 17.
17. DISPENSING
 PROFESSOR WULLING AND MR. BACHMAN
 Five and one-half credits (twenty-seven hours lecture, one hundred forty-four hours laboratory)
 Third and fourth quarters, second year
 Prerequisite, pharmacy 16
 The study of the prescription and practical work in dispensing upwards of one hundred typical prescriptions.
18. MANUFACTURE OF OFFICIAL ORGANIC AND INORGANIC SALTS AND PREPARATIONS
 PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT
 Four and one-third credits (twenty-four hours lecture, one hundred eight hours laboratory)
 Second quarter, second year
 The preparation of about forty official salts included in the course.
19. NATIONAL FORMULARY
 PROFESSOR WULLING AND MR. BACHMAN
 One credit (six hours lecture, twenty-four hours laboratory)
 Third quarter, second year
 This course includes the study of the National Formulary and the making of one or more members of each class of preparations.
20. PHARMACEUTICAL ASSAY
 PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT
 One and one-third credits (six hours lecture, thirty-six hours laboratory)
 Fourth quarter, second year
 Prerequisites, pharmacy 14 and chemistry 3
 The quantitative determination of active constituents of a number of the potent organic drugs and preparations.

21. **SYNTHETIC REMEDIES** PROFESSOR WULLING
 One-third credit (six hours lecture) Fourth quarter, second year
 Prerequisite, pharmacy 12 and 13 and chemistry 4
 A study of the chemistry of synthetic remedies in medical use.
22. **HOMEOPATHIC PHARMACY** PROFESSOR WULLING AND MR. BACHMAN
 Fourth quarter, second year.
 A brief exposition of the principles underlying homeopathic medication, with some laboratory work.
23. **IDENTIFICATION OF SALTS** MR. BACHMAN
 One and one-half credits (fifty-four hours laboratory)
Second semester, first year and entire second year
 The study of the physical identity of the more important official inorganic and organic salts.
24. **MICRO-CHEMISTRY** PROFESSOR WULLING
 Fourth quarter, second year. (Optional)
 A brief course is provided for seniors if time permits.

PHARMACEUTICAL JURISPRUDENCE

1. **LAW FOR PHARMACISTS** PROFESSOR WULLING
 Two-thirds credit (twelve hours lecture) Fourth quarter, second year
 The lectures introduce the subjects of contracts, agency, commercial paper, insurance, and discuss the liability of retail and manufacturing pharmacists, etc.

PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY

1. **MINERALOGY** MR. GROUT
 One credit (eighteen hours lecture) Second quarter, second year
 Prerequisite.
 A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relations.
2. **CRYSTALLOGRAPHY** MR. GROUT
 One credit (eighteen hours lecture) Second quarter, second year
 Prerequisite, mineralogy 1
 A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks.

PHARMACOGNOSY

..... Professor of Pharmacognosy
 FREDERIC K. BUTTERS, M. S., Instructor in Pharmacognosy
 Assistant

1. **CRUDE VEGETABLE DRUGS** MR. BUTTERS
 Ten credits (ninety hours lecture, one hundred and eight hours laboratory)
second year
 Prerequisites, Botany 1, 2 and 3.
 The vegetable drugs of the United States Pharmacopœia are taken up in the following order: Roots, rhizomes, tubers and bulbs, woods, barks, leaves, herbs and flowers, fruits, seeds, plant exudations, resins, gum-resins, waxes and starches. Each drug is carefully examined, both macroscopically and microscopically. Students are

also provided with specimens for home study. The lectures give the history and important features of each drug, with consideration of its importance to the pharmacist. The quizzes include careful drill on the constituents, action and dose and official preparation of each drug considered. Identification receives careful attention and there are weekly tests of the student's ability. A short course is given in the microscopic examination of some of the more important alkaloids and glucosides, and of certain emulsions and inorganic salts, if time permits.

The drugs are considered in the following order;

Roots—Sarsaparilla (Mexican, Para and Honduras), senega, gentiana, taraxacum, pyrethrum, lappa, stillingia, sumbul, phytolacca, althæa, belladonna, calumba, glycyrrhiza, (Spanish and Russian), ipecacuanha, pareira, krameria.

Rhizomes—Aspidium, zingiber (Jamaican, East Indian and African), calamus, veratrum, cypripedium, convallaria, triticum, sanguinaria, geranium, podophyllum, valeriana, serpentaria, spigelia, hydrastis, cimicifuga, leptandra, gelsemium, berberis, scopola, rheum, apocynum.

Tubers and Bulbs—Jalapa, aconitum, colchicum, scilla.

Woods—Quassia, hæmatoxylon, santalum rubrum.

Barks—Cinchona (Rubra et Flava), prunus virginiana, hamamelis, viburnum prunifolium, viburnum opulus, rubus, quercus alba, granatum, frangula, rhamnus purshiana, xanthoxylum, mezereum, gossypium, euonymus, quillaja, ulmus, sassafras, cinnamomum (Ceylon, Saigon and cassia).

Leaves and Leaflets—Pilocarpus, eucalyptus, uva ursi, senna (Alexandria and India), coca (Bolivian and Truxilla), belladonna, stramonium, hyoscyamus, digitalis, matico, salvia, hamamelis, eriodictyon, chimophila, buchu (long and short).

Herbs and Flowers—Santonica, caryophyllus, calendula, cuso, arnica, matriaria, anthemis, rosa gallica, scoparius, eupatorium, grindelia, lobelia, mentha piperita, mentha viridis, hedeoma, marrubium, scutellaria, chirata, sabina.

Fruits—Humulus, piper (longum, nigrum et album), pimenta, rhus glabra, capsicum, colocynthis, cassia fistula, cardamomum, vanilla, coriandrum, conium, anisum, carum, fœniculum (Roman and German), aurantii amari cortex, aurantii dulcis cortex, limonis cortex et succus, prunum, tamarindus (East and West Indian), ficus, sabal.

Seeds—Physostigma, amygdala (dulcis et amara), pepo, myristica, sinapis (alba et nigra), nux vomica, staphisagria, ricinus, tiglium.

Miscellaneous—Guarana, lactucarium, alce (Socotrina, Barbadosensis, et Capensis), kino (Malabar et Pallas), gambir, opium, elastica, manna, saccum, benzoinum, cambogia, asafetida, scammonium, myrrha, copaiba, terebinthina, terebinthina canadensis, resina, pix liquida, styrax, balsamum peruvianum, balsamum toluatanum, camphora, thymol, menthol, ergota (Spanish and German), sassafras medulla, galla (Aleppo et Chinensis), gossypium purificatum, lupulinum, lycopodium, amyllum, maltum.

Besides the foregoing, a number of the more important unofficial drugs, and the animal drugs will also be discussed.

2. POWDERED DRUG.

MR. BUTTERS AND ASSISTANT

One credit (nine hours lecture, twenty-seven hours laboratory)

Fourth quarter, second year

Prerequisite, pharmacognosy 1

This course consists of laboratory work and occasional lectures. The more important vegetable drugs are examined microscopically, in powdered form. Especial attention is paid to the identification of unknown powders, and to the detection of the various forms of sophistication to which powdered drugs are subject.

PHYSIOLOGY

RICHARD O. BEARD, M.D., Professor of Physiology

M. R. WILCOX, M.D., Professor of Physiology

JULIUS PARKER SEDGWICK, B.S., M.D., Instructor in Physiological Chemistry

FREDERICK H. SCOTT, Instructor in Physiology

1. PHYSIOLOGY, ANATOMY AND HISTOLOGY PROFESSORS BEARD AND WILCOX

One credit (eighteen hours lecture and recitation) First quarter, second year
1. The work covers the study of the physiological properties of the cell, the nutritive media, the nervous mechanisms in general, muscular tissues, connective tissues and epithelial tissues. The subjects of anatomy and histology are touched upon sufficiently to lay the foundation for the proper understanding of physiological functions

Special attention is directed to the action of drugs and their effects upon the various systems.

2. QUALITATIVE AND QUANTITATIVE URANALYSIS (Post-Graduate)

PROFESSOR BEARD AND DR. SEDGWICK

One credit (nine hours lecture, eighteen hours laboratory)

Second semester

Prerequisite, Physiology 1.

Lectures, recitations and laboratory work. The laboratory work includes the qualitative analysis of representative specimens of urine as regards their physical properties, inorganic and organic constituents, as well as the quantitative determination of chlorides, urea, ammonia, total nitrogen, sugar and albumin, together with the preparation of reagents.

3. EXPERIMENTAL PHYSIOLOGY (Post-Graduate) PROFESSORS BEARD AND WILCOX

Four credits (thirty-six hours lecture, seventy-two hours laboratory)

Second semester

Prerequisite, physiology 2.

Laboratory work and demonstrations. A study of physiologic apparatus, electric stimuli and methods of experimentation; the demonstration and performance of experiments which illustrate physiologic function in the muscular, nervous, vascular respiratory and glandular systems; and the study of the cardiac areas, the heart and respiratory sounds, and of pulse tracings including training in the use of sphygmograph the stethoscope, phonendoscope, etc.

4. PHYSIOLOGICAL CHEMISTRY AND MICROSCOPY (Post-Graduate)

PROFESSORS BEARD AND WILCOX AND DR. SEDGWICK

Eight credits (seventy-two hours lecture, one hundred forty-four hours laboratory)

First semester

Prerequisite, physiology 3.

Laboratory work and demonstrations. A practical study of the several classes of proteids; of carbohydrates, fats, muscle and bone; of gastric juice, saliva, pancreatic juice and bile in their respective digestions; of glycogen, and of blood lymph, chyle and milk. Microscopic study of the carbohydrates in vegetable and animal forms; of the physiologic emulsions of fat; of the crystalline waste, products, and of the physiologic conditions of the blood cells and of blood crystals. Practical instruction is given during this course in the enumerations of the blood cells, in the estimation of hæmoglobin and of the corpuscles in mass, in the spectroscopic examination of the blood in the determination of blood tests, and in the use of polariscope.

MINNESOTA PHARMACY LAW

Several lectures elucidating the rights, duties, privileges and liabilities of pharmacists under the state law regulating the practice of pharmacy, are given by special lecturers near the close of the second year.

SPECIAL LECTURES

From twelve to fifteen special lectures on subjects related to the practice of pharmacy are delivered by well-known pharmacists and others at intervals during the college year.

LECTURE AND LABORATORY SCHEDULES

The work of the regular course for 1910-'11 will be somewhat augmented, but the herewith schedule of the past year will be adhered to as far as possible. The necessary changes will be posted on the college bulletin in September.

The college year is divided into four quarters, the first and second constituting the first semester, and the third and fourth the second semester. The college year covers nine full months or thirty-eight weeks. Each quarter consists of nine working weeks.

To the second and fourth quarters, one examination week is added.

First Semester---Junior and Senior Schedule

FIRST QUARTER					SECOND QUARTER											
1910	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30
Mon.	Botany Lecture	Botany Laboratory			General Chemistry				Botany Lecture	Botany Laboratory				Qualitative Chemistry		
Tues.		Ph'm'cal Chem.	Met'gy Lecture		General Chemistry				Pharmaceutical Laboratory and Lecture Work							
Wed.	Botany Lecture	Green house work	Pharma-ceutical Chem.		General Chemistry				Botany Lecture	Green-house work	Pharmaceutical Chemistry			Qualitative Chemistry		
Thurs.		Pharma-ceutical Chem.	Metr'gy Lecture		General Chemistry				Pharmaceutical Laboratory and Lecture Work							
Fri.	Botany Lecture	Pharma-ceutical Chem.	Pharmaceutical Laboratory		General Chemistry				Botany Lecture	Pharma-ceutical Lecture	Pharmaceutical Laboratory			Qualitative Chemistry		
Sat.	Make-up Laboratory															
Mon.	Material Medica	U. S. P. Testing			Dispensing				Material Medica	Quantitative Chemistry				Pharmaceutical Labor'ry		
Tues.	U. S. P. Testing		Organic Pharm.		Dispensing				Pharmacognosy		Phys'gy Lecture		Organic Pharm.		Mineralogy and Crystallography	
Wed.	Material Medica	Pharmacognosy			Dispensing				Material Medica	Quantitative Chemistry				Mineralogy and Crystallography		
Thurs.	Organic Pharm.	Pharmacognosy			Dispensing				Pharmacognosy		Phys'gy Lecture		Organic Pharm.		Pharmaceutical Laboratory	
Fr.	Material Medica	U. S. P. Testing			Organic Pharm.		Dispensing		Material Medica	Quantitative Chemistry				Pharmaceutical Laboratory		
Sat.	Make-up Laboratory															

Second Semester---Junior and Senior Schedule

THIRD QUARTER										FOURTH QUARTER									
1911	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30	8:30	9:30	10:30	11:30	1:30	2:30	3:30	4:30			
Mon.	Botany Lecture	Botany Laboratory			Organic Chemistry				Botany Lecture	Botany Laboratory			Organic Chemistry						
Tues.	Material Medica	Pharmacy Lecture and Laboratory			Organic Chemistry				Material Medica	Pharmacy Lecture and Laboratory			Organic Chemistry						
Wed.	Botany Lecture	Green-house Work	Material Medica	Pharmaceutical Chem.	Organic Chemistry				Botany Lecture	Green-house Work	Material Medica	Pharmaceutical Chem.	Organic Chemistry						
Thurs.	Pharm. Quiz	Pharmacy Lecture and Laboratory			Organic Chemistry				Pharm. Quiz	Pharmacy Lecture and Laboratory			Organic Chemistry						
Fri.	Botany Lecture	Material Medica	Pharmaceutical Chem.		Organic Chemistry				Botany Lecture	Material Medica	Pharmaceutical Chem.		Organic Chemistry						
Sat.																			
Mon.	Pharmacopoeial Assay		Organic Pharm.			Pharmacopoeial Assay				Pharmacy Lecture and Laboratory		Organic Pharm.	Pharmacy Lecture and Laboratory						
Tues.	Pharmacognosy Laboratory								Pharmacognosy Lecture and Laboratory										
Wed.	Pharmacognosy Laboratory				Pharmacopoeial Assay				Pharmacognosy Lecture and Laboratory										
Thurs.	Special Lectures		Organic Pharm.			Pharmacognosy Laboratory				Special Lectures		Organic Pharm.	Pharmacognosy Lecture and Laboratory						
Fri.	Pharmacopoeial Assay				Pharmacopoeial Assay				Pharmacy Lecture and Laboratory		Law		Pharmacy Lecture and Laboratory						
Sat.																			

Students

JUNIOR PHARMACISTS 1909-10

Adams, Edward M., Wayzata, Minn.	Lieb, G. Aloysius, Alton, Iowa
Anderson, Ben. G., Wheaton, Minn.	Lillie, A. Laura, Rockford, Minn.
Ash, Ben S., Delano, Minn.	Meland, Richard B., Pelican Rapids, Minn.
Boardman, Roy J., Rochester, Minn.	Millard, Susan S., Breckenridge, Minn.
Bostrom, John A., Evansville, Minn.	Monson, Martin J., Delhi, Minn.
Burns, Donald S., South St. Paul	Newsom, Alice P., Menomonie, Wis.
Broude, Samuel J., Minneapolis	Nordstrom, Burt A., Sacred Heart, Minn.
Carman, John A., Detroit, Minn.	Paine, Stephen S., Lake City, Minn.
Cary, Frank R., Alden, Minn.	Peters, Wm. M., Minneapolis.
Cook, Wilford C., Minneapolis	Peterson, Albert W., Litchfield, Minn.
Courtney, John F., Glenwood, Minn.	Ponthan, Marie W., St. Paul, Minn.
Erickson, Oscar H., Canby, Minn.	Poort, Jacques J. Jr., Strasburg, N. D.
Gifford, Frank A., Madison Lake, Minn.	Prevost, M. Estelle, Big Timber, Mont.
Gouterman, Robert, Minneapolis.	Reynolds, Ross J., Barry, Minn.
Haynes, Manley H., Minneapolis	Slawson, Frank W., Minneapolis.
Henton, Jay C., Morton, Minn.	Snyder, Bessie, Hector, Minn.
Hughes, Stuart, Minneapolis	Spengler, W. A., St. Paul
James, Chas. W., Rochester, Minn.	Spiegel, Louis, Minneapolis
Jepson, Paul, Nashua, Iowa	Steiner, Frank A., Mankato, Minn.
Johnson, Theodore, Parker's Prairie, Minn.	Tedder, Chas D., Rockwood, Tenn.
Knatterud, Christian E., Spring Park,	Titus, James L., Berea, Kentucky.
Minn. Whittemore, A. A., Detroit, Minn.	Weber, Frank J., Le Sueur Center, Minn.

SENIOR PHARMACISTS 1909-10

Austin, Alberta J., Milbank, S. D.	Kusterman, Fred G., St. Cloud, Minn.
Becker, Frank A., Olivia, Minn.	Lundberg, Wm. W., Brownton, Minn.
Bersing, Delbert E., Blair, Wis.	Marsh, Edward M., Pine Island, Minn.
Bugbee, Guy C., Paynesville, Minn.	Munro, Will R., Cummings, N. D.
Butterfield, Frederick R., Minneapolis	Noer, Victor R., Colfax, Wis.
Carlson, Helma, Erskine, Minn.	Orr, Merton J., Bismarck, N. D.
Carlson, Arthur E., Mankato, Minn.	Parker, Claude H., Minneapolis
Casey, J. Ambrose, Aitkin, Minn.	Paulson, Carl A., Minneapolis
Caton, Charlotte E., Minneapolis	Peterson, Hugo O., Minneapolis
Doeltz, Otto P., Minneapolis.	Remes, Anastasia M., New Prague, Minn.
Earle, Fred W., Rochester, Minn.	Reum, Arthur W., Minneapolis
Ebeltoft, Wm. H., Lake Park, Minn.	Schreiter, Norman C., Red Lake Falls
Errickson, Carl A., Cashton, Wis.	Skartum, Juanita M., Lake Benton, Minn.
Harding, Chester E., Delta, Colorado.	Souba, Emil G., Hopkins, Minn.
Homerberg, Victor, Hopkins.	Spellman, Clyde A., Montevideo, Minn.
Hoppe, Wm. F., Breckenridge, Minn.	Van Campen, Harry A., Cannon Falls
Janecky, George A., Hutchinson, Minn.	Yamagishi, Kozo, Kobe, Japan
Kelly, John V., St. Paul	Zalesky, Pauline B., St. Paul, Minn.
Klovstad, Thomas, Milan, Minn.	Zender, Chas. H., Henry, S. D.



